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Contents

Articles

Departments

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Significance of the Wage-Hours Law

Arnold Krueckman

VARIOUS trade organizations have published valuable analyses of the Wage-Hours Law. These expositions almost invariably take the Law apart and present the dissected details in literal quotation as answers to questions that frequently occur to those who are most vitally interested. This skillful marshalling of the words of the exact text is very useful, as also are the different legalistic studies of the Act. This article will be neither literal nor legalistic, but, from the standpoint of the trained journalistic observer, will present what seems to be the essence of the purpose of the Law.

The Magna Charta of the Law

First, it is important to know that the decision of the Supreme Court in the case of the Santa Cruz Fruit Packing Co. against the National Labor Relations Board, published on March 28, 1938, is regarded by the officials of the Department of Labor as the Magna Charta of the Wage-Hours Law. The assistant solicitor of the department, Rufus Poole, author of the Act, is understood to have written it to fit within the wide boundaries of the Supreme Court decision. This careful compliance with the Court's striking and new interpretation of what constitutes interstate commerce is assumed to have made the application of the Wage-Hours Law ironclad against juridical attack.

The administration considers the Santa Cruz Fruit Packing Co. decision as one of the most momentous incidents in current history. Although very few industrialists, and even very few lawyers have any knowledge of this decision, it is supposed to have virtually destroyed state lines in interstate commerce. The decision lays down as law the ruling that goods delivered f. o. b., or CIF, within the state of their origin and subsequently distributed beyond the boundaries of the originating state by other parties, are "in the stream of interstate commerce," and thus, in every relation to the welfare of the nation, come under federal control. This means that wares manufactured and sold solely in a specific state, when distributed by independent jobbers, wholesalers, or agents, wholesale or retail, in other states, bring the original industry entirely under the regulation of the Federal Government. In the past federal jurisdiction was limited to control of misbranding and unfair trade practices. The sweeping Santa Cruz Fruit Packing Co. decision extends the jurisdiction over regulation of labor practices and, in effect, over all social and economic practices that might be policed by the Federal Government.

Business Activities Involved

Although you actually do not know what becomes of the goods after they leave your factory or warehouse, the Law now holds that you are competing in interstate commerce when others, whom you do not know, sell the goods you made or sold in other states in competition with similar goods. The Supreme Court further cinched the application of the doctrine by ruling that the Law applied even though the Santa Cruz Fruit Packing Co. obtained all its raw materials in California, manufactured them in California, and sold and delivered them in California. Finally, the Court ruled, although only a fraction of a per cent. of the total business may be an interstate transaction, no matter how negligible the actual quantity that eventually found its way into interstate commerce, the fact that any interstate commerce resulted was sufficient grounds for bringing the industry under federal regulation.

The manufacturer and the distributer either must prohibit and actively prevent export of wares beyond state lines, or they must submit to federal control; for, without vigilant policing, it is impossible to prevent some fraction of wares from getting into the "stream of interstate commerce." And purely intrastate commerce would distressingly shrink almost all business, dislocate the entire mechanism of commerce, curtail employment, and limit the present variety and wealth of supply available to the

ultimate consumer. Thus, practically, all wholesale business inevitably must become federalized, and most retail business apparently will be subject to some form of federalized regulation.

The Wage-Hours Law specifically exempts "any employe engaged in any retail or service establishment the greater part of whose selling or servicing is *intrastate.*" This clause apparently was hastily written into the Law during the last hectic moments of the fight in the Congress. It is obviously in conflict with the Santa Cruz Fruit Packing Co. decision. It is in conflict with the control exercised by the Federal Trade Commission over department stores, and over other retail establishments, which sell any part of their merchandise by retail in interstate trade. Mail-order institutions selling by retail are entirely under federal control. Informally the word has already been allowed to spread that chain stores might be able to apply the retail exemption to certain strictly local sales clerks, but that shipping personnel, truck drivers, and office and custodial personnel will undoubtedly come under the federal regulation. The Wage-Hours Law significantly defines a local newspaper exempt from the Law as a publication of 3,000 circulation, or less, distributed solely in the county where it is published. The implication of the clause is important because it is generally assumed to define what may be accepted as retail business. Retailing exempt from the Wage-Hours Law will undoubtedly be limited to an absolutely local business.

Rapidity of Institution

The Law goes into effect either on October 24 or 25. There is a difference of opinion about the legality of the earlier date. Some broad, general regulations will be promulgated by the new administrator probably early in October. But it is not expected that the full flower of the effect of the Law will be sharply perceptible until 1940. The Government plans to move slowly. It is not even prepared yet to say how many workers will be affected. The Bureau of Labor Statistics, with the help of State Labor agencies and labor unions, has been assembling data about industries, workers, and conditions in the various geographical subdivisions where climate and other circumstances have created sharp economic and social differentials. The Children's Bureau in the Department of Labor also has been gathering information about the problems to which the new Wage-Hours Division must apply the Law. Realistic studies have been in progress by the Legal Division of the Labor Department, the results of which will be ready for the consideration of the new administrator.

Hazards of Non-Compliance

The Wage-Hours Law, as written, is chiefly a broad outline. The administrator is empowered to supply the body and substance. However, if any part of the Law is violated, either employe or competitor may instigate action to arrest sale of products; to prohibit jobbers and distributers from handling such products; and such producers may be liable to a fine of $10,000; six months in jail, or both; and each employe who has received substandard wages may collect damages and double the amount of the wages due, plus costs, and plus attorneys' fees. Moreover, if in manufacturing and distributing wares, you use machinery, or parts, or materials, no matter how insignificant, not made in compliance with the Law, you are held just as criminally guilty as the original offender. For instance, if you place a label on a package, and the label is printed with ink manufactured illegally, you will be held liable exactly as the original ink manufacturer is liable. The same responsibility naturally attaches to the printer, the jobber who may have sold the labels to you, and the jobbers and distributers to whom you sell the package bearing the label. To avoid this situation, demand a certificate from those from whom you buy guaranteeing that they have complied with the Law. Your customers will naturally expect you to furnish a similar vendor's certificate.

Classes of Employes Affected

In the beginning there were before Congress a minimum wage bill and a separate bill fixing maximum hours. The bills were combined, but the hours maxima and wage minima are as definitely divorced as if they were separate laws. The wage minima apply largely to unskilled labor. But the hours maxima applies to *every* industry, and, practically, to every worker, in interstate commerce. All workers, no matter what salaries or wages they receive, except a limited number of special classes such as sailors, farm workers, railroaders, administrative and executive employes and professional workers, are subject to the Wage-Hours regulations. Professional workers are not classified as professionals when they work for a salary. All workers on salary, or wage-earners, no matter how high their pay, must obey the hours maxima. This includes office and custodial employes. When they work overtime, they must be paid time and a half. For instance, members of your legal staff working for a salary, although they receive $25,000 or $30,000 per year, may not work more than eight hours per day, or 40 hours per week, unless you pay them overtime at time and half on the scale of the salaries they regularly receive. This also applies to accountants, controllers, treasurers, advertising writers, and other workers who are paid relatively liberal salaries. The hours maxima are mandatory. They may not be altered at the discretion of the administrator.

Employers' Records

Employers must keep and preserve records of the history, wages, hours, conditions of work or service, and of labor or work practices in each individual unit of business, for each employe. These records must be maintained in a comprehensive form and must be available for inspection by Government officials.

Enforcing Personnel

The new division will have 250 special inspectors in the field. They will have the help of personnel of the labor departments of various states and of the experts of the labor unions. The Wage-Hours policemen will be part of the 2,000 to be employed by the new agency. The annual operating budget is estimated in excess of $2,000,000 per year. The NRA, a comparable unit, during its last year, employed 5,300 and spent $12,496,731. Mr. Poole and his present chief, Solicitor Gerard D. Reilly, are regarded as the real powers behind the Law, at this time. The administrator, Elmer F. Andrews, former New York Labor Commissioner, helped make the Law at the White House conferences. A mechanical engineer, railroader, and World War aviator, he learned his practical social economy under Secretary of Labor Perkins, to whom he was deputy while she was Labor Commissioner of New York and Mr. Roosevelt was governor. It is felt Mr. Andrews will faithfully reflect the president and the secretary.

The unique institution of the new division, mandatory

by the Law, consists of the industry committees. Twenty-four are in process of gestation, including one for the rubber industry. An industry committee may represent an entire industry, or different parts and sections of an industry. Broadly, the functions of these committees are designed to fix fair labor standards and pay. The committees have vast and vague powers to summon witnesses and evidence to consider "economic and competitive conditions" and "transportation, living, and production costs." It is expected there will be nine members on each committee. Three each will be chosen to represent the public, the workers, and the employer-management. It is anticipated, following established custom, the Labor Department will suggest that the universities and social organizations furnish the representatives of the public. The unions undoubtedly will supply the workers' representatives.

Apprehensions of the Law

If the Law does not effectively do so, it has already been suggested, that it may be necessary to make a Law to limit profits, another to limit the volume of production per worker, and still another to increase the use of manpower by limiting the use of machinery. Obviously, price control as well as control of profits, dividends, manager salaries, and production costs are objectives, by means of the supervision of the committees. It is believed the example and precept of these committees will swiftly cause their multiplication, even as part of each separate firm or corporation.

The administrator has discretion in fixing wage minima. It is understood the ultimate 40¢ per hour minima may become effective in most industries immediately. The influence of the imminence of the Law is already apparent in several industries. The lumber industry has been operating at top speed producing a surplus stock for storage in its own yards, and to supply the retailers, and others, throughout the country who anticipate a sharp increase in prices when the Law goes into effect. This steep tilt in prices also is expected to check the reciprocal trade treaty negotiations. The increase in the margin of prices between the United States and other countries may make the necessary concessions impossible. They even say the long-delayed trade treaty with England may be indefinitely checked.

Meanwhile Madame Perkins energetically fosters a drive to induce *all* states to make a Wage-Hours Law patterned after the federal law. She furnishes a model for consideration upon request.

And, finally, it is extremely interesting to learn that France, after operating for two years on the maximum of eight hours daily, five days a week, or 40 hours per week, has set about to modify the schedule. *The workers themselves demanded it.* The increased cost lowered consumer demand and sharply diminished employment.

For Riding Comfort

AT THE recent summer meeting of the Society of Automotive Engineers, H. A. Hicks and G. H. Parker, of the Chrysler Corp., presented a paper, "Harshness in the Automobile," in which they stated an ideal car would travel over an ordinary road so that the only indication of motion would be sight of the passing landscape; human facilities would be unhindered and would remain unimpaired for complete enjoyment of the trip. Many kinds of car harshness affect a human's senses, but the authors restricted their remarks to that resulting from tire road contact.

Rubber has been employed in efforts to eliminate harshness. Cushioning pads are a favorite device. Thus with a frame of the conventional X-type rubber-spool insulators are put between body and frame at points of attachment. Their movement is restricted so that in case of serious structural distortion the body functions within the frame; whereas with small movements the insulators soften the car. Any loss in stiffness, no matter how small, is begrudged since the primary aim is structural rigidity.

Another kind of insulator against noise and harshness has been evolved for use at the spring ends, where insulation presents the following advantages: no reduction in structural rigidity, application of insulation equally well to both the conventional and the unit type of construction, placing of insulation closer to the seat of vibration. These shock and vibration cushioners comprise rubber bonded to small metal disks, so mounted at the spring ends that the rubber is loaded in shear. They are free to deflect vertically and longitudinally, but are definitely limited laterally. The shear rubber for the front independent suspension may be built into the knuckle support. Since deflations up to $^3/_{16}$-inch each way from the normal position are easy, it results from the equation "energy equals force times displacement" that should the deflection with the normal spring connections under a given load be even as much as $^1/_{32}$-inch, it would be cut to one-sixth its former value by the insulators. Although so far only few tests have been performed, this means of insulation seems most efficient in reducing harshness.

Rubber-Tired Cotton Chopper

COTTON is planted thickly, in rows about three feet apart. When the plants have grown to a few inches in height, they are thinned out into hills of two or three plants spaced about a foot apart. This thinning process, which is called chopping, has been done, in the past, by hand labor with hoes. About an acre a day is the capacity of the average man engaged in cotton chopping.

In 1937 the Dixie cotton chopper was put on the market after a period of 16 years of development. The machine, called "the rubber-tired hoe with a seat on it," is simple in construction; the chopping mechanism, a unit of four rotating blades, hangs beneath a light cart equipped with two rubber-tired wheels and an operator's seat. As the machine is pulled along over the row of cotton, the rotating blades dip lightly into the ground, thin the cotton to the desired distance between hills, and clean the row of weeds and grass. The blades back into the ground, heel first, and come out point last, leaving the loose dirt in the row. This arrangement is said to prevent tangling of the unit and to create a moisture-holding mulch around the plants. The one-row machine averages about ten acres a day; while the two-row chopper will do 20 acres a day with a team of horses and 30 acres a day with a tractor.

An important factor in the development of the Dixie chopper was the introduction of pneumatic tires about five years ago. Implement tires (16 by 5.50), inflated to five pounds per square inch, are used for both the one-row and two-row machines, which weigh 440 and 627 pounds respectively. The low-pressure tires eliminate shaking and bouncing that would remove the cutting unit from the ground.

Rubber in Aviation

Ray W. Brown[1]

WHEN the average person thinks of the part that rubber plays in the make-up of the present day airplane, he is inclined to believe that the use of rubber begins and ends with the tires on which the plane takes off and lands. Upon investigation, he would discover somewhat to his surprise that the rubber in the tires constitutes only one-third of the total volume of rubber that goes into the construction of a modern airplane.

Pilot Ray W. Brown and the Lockheed Vega, Eleventh Airplane Owned by the General Tire & Rubber Co.

Diversified Uses

Shock-proofing, insulation, and weather-proofing are three of the primary uses to which rubber is put in aviation today. Rubber is used to absorb or reduce shocks, due to vibration or outside interference, in the engine shock mounts and the radio shock mounts.

On the outside of modern airplanes the use of rubber is apparent both in the tires and in the de-icing equipment with which some planes are provided. Inside the planes one finds sponge rubber used for cushioning and rubber stripping for packing and sealing the joints. Rubber cloth is used extensively in the way of cushion covers and for clothing bags in sleeper planes. Shock cords, used in keeping articles in the plane in a stationary position, also utilize a certain amount of rubber.

Because of its lightness, hard rubber is used extensively on door knobs and radio control panels. Even the control column wheels are covered with hard rubber.

Recently a number of experiments were carried on with reference to the use of rubber in connection with fuel tank mountings and similar uses. All oil, gas, and fluid conveyers must have rubber joints at regular intervals of every few inches or feet to allow for flexibility.

Tire Characteristics

Airplane tires have undergone a decided evolution in the past ten years. Before the fixed landing gear was discarded in favor of the retractable gear, parasitic drag was an important factor to be considered in the speeding up of airplane travel. To overcome parasitic drag as much as possible, General Tire & Rubber Co. invented and produced the first streamline airplane tire in December, 1930, which reduced parasitic drag to the tires and wheels to a minimum. This type of tire, which at present is standard equipment on all Army Air Corps planes, was first tested in the company's wind tunnel in July, 1930, and officially by the U. S. Army Air Corps in December, 1930, and January, 1931.

With the general adoption of retractable gears this tire has lately been developed to a point where the streamline characteristics have given way to greater advantages which the wide base tire and wheel possess. The smooth contour streamline tire is the newest development of this type tire, and it has been announced that a still newer development of this type will soon appear.

Protection Against Weather

One also finds rubber in modern airplanes in the pilots' aprons which are used when flying through terrific rain and snow storms when it is almost inevitable that some of the rain or snow will sift through. In making planes weather-tight, rubber today plays a big part in adding to the comfort of the passengers on modern airliners, for rubber is used in every place where an aperture might permit the weather to get in if it were not sealed up.

Even the rugs in the modern airliners have rubberized backing which prevents disintegration and prevents oil and moisture from coming through. Before he enters the ship the modern air passenger comes in contact with rubber in aviation, for he walks up a rubber tread on the gangway to enter the ship. Rubber shields are used at various points in the electrical system to exclude moisture.

Insulation

In every instance where metal pipes pass through metal bulkheads or wherever they come in close contact in any way with other metal, rubber is used to insulate and cushion this contact. Electrical wires are covered with synthetic rubber composition with high heat-resisting and insulating properties.

In fact there is now no discernible limit to the application of rubber in present-day aviation, and as the planes become larger and more modern, more and more rubber is being used in the fabrication of the new design.

ELEVATOR PRECAUTIONS. When using a temporary elevator, the door should be closed before the car is started. Never try to board a moving elevator. *National Safety Council.*

[1] Aeronautical tire sales manager, General Tire & Rubber Co., Akron, O.

A Survey of Methods for Evaluating Carbon Blacks[1]

I. Drogin[2]

IN THE selection of carbon black for use in rubber products technologists must consider the problem from at least two points of view: first, the influence of the carbon black on the ultimate properties of the rubber, and, second, the adaptability of the carbon black to the processing and vulcanizing conditions established by limitations of equipment. Were a more accurate knowledge available as to how various carbon blacks differ, it would be easier to standardize practice so as, firstly, to obtain a uniform product, and, secondly, to determine in advance the suitability of a given carbon black to specific conditions of manufacture.

As previously pointed out,[3] the uniformity and quality of channel-process carbon black are limited by many factors, among which are numbered chiefly the design of the burner house or hot house, the composition of the natural gas used, the "sourness" or "sweetness" of the gas as determined by its hydrogen sulphide content, the tip design and its spacing in reference to the channels, the rate at which the gas is burned, draught conditions, and hot-house temperature.

The development of short critical tests to predetermine the suitability of the black from both these points of view has not yet been realized. So with the increasing use of carbon black by the rubber industry in the last two decades, technologists in both the rubber and gas black industries have been seeking new methods of evaluating carbon black.

Naturally attention was first turned toward the physical and chemical characteristics of carbon blacks, among which are the following: appearance under the microscope, apparent volume, specific gravity, particle size and shape, surface area, X-ray diffraction data, optical properties, color, tinting strength, rate of settling, thermal conductivity, specific heat, heat of wetting, adsorption characteristics, ultimate chemical analysis, volatile matter, ash, extractable matter, and grit.

While the results of many of these chemical and physical tests may reflect the care which has been used in the manufacture of the black, they cannot be depended upon to predict the effect of carbon black on processing and reenforcement and are generally of little value to the rubber technician as control tests for uniformity. However a few of the tests are of somewhat more practical value than the others mentioned. For instance, differences in volatile matter[4] or in accelerator adsorption[5] indicate differences in rate of vulcanization. A high grit content in carbon black may cause premature failure of a rubber compound and will probably induce flex-cracking.[6]

Reliance must therefore still be placed almost entirely on tests showing the behavior of the black in rubber. As a result, the physico-chemical line of investigation has been gradually supplemented by an ever-increasing number of tests to bring out the difference between vulcanized rubbers compounded with different carbon blacks. Determinations are made of stress-strain characteristics, hardness, hysteresis, resilience, aging, and resistance to tear, flex-cracking, abrasion, and detrition.[7] (The detrition test is used to determine the wearing capacity of a compound. The test-piece, a rubber ball, is placed in a groove and rotated under a definite load. The ball is then cut in half, and the exposed surfaces are examined.) In addition this line of investigation has been extended into a study of unvulcanized compounds, e.g., ease of mixing, degree of dispersion, temperature during mixing, plasticity, and extrusion characteristics.

This entire series of tests, however, still fails to reveal the complete picture of ultimate service. In some cases carbon-black-rubber compounds tested by all these methods appear to be very much alike and yet will show wide differences under identical service conditions. The conclusion is that either the tests are not sensitive enough, or else they do not reveal or measure some other inherent characteristics of the carbon blacks which have a definite effect upon the ultimate service.

The trend recently has therefore been, first, to increase the sensitivity of present tests, and, second, to devise new tests to reveal hitherto unknown characteristics of carbon black. Continual improvements of apparatus have resulted in gradually increasing sensitivity of tests for determining, notably, the ease of mixing carbon black,[8] the extrusion characteristics of carbon-black-rubber compounds,[9] the energy absorbed as a result of impact,[10] resilience,[11] and the efficiency of the compounded rubbers as vibration absorbers.[12]

Attempts to discover new differences in carbon blacks have resulted in the development of several new tests. One example is the flexometer test,[13] which measures the rate of heat generation and the resistance to breakdown of a stock subjected to repeated distortions under compression.

The compression flexometer as developed by the Firestone Tire & Rubber Co.[14] has been modified to some extent by the St. Joseph Lead Co.[15] A more recently developed compression flexometer is one announced by The B. F. Goodrich Co.[16]

In the St. Joe flexometer the rubber test piece acts as a

[1] Presented at the Rubber Technology Conference, London, England, May 23-24, 1938. Reprinted from the "Proceedings of the Rubber Technology Conference."

[2] Chief chemist, J. M. Huber, Inc., New York, N. Y.

[3] I. Drogin, *India Rubber J.*, 90, 259 (1935).

[4] C. R. Johnson, *Ind. Eng. Chem.*, 20, 904 (1928).

[5] I. Drogin, INDIA RUBBER WORLD, 83, 57 (1931).

[6] J. N. Street, *Ind. Eng. Chem.*, 24, 559 (1932).

[7] Louis Schopper (Leipzig), "Rubber Testing Machinery," Catalog No. 301, p. 21.

[8] F. K. Schoenfeld and R. P. Allen, *Ind. Eng. Chem.*, 25, 1102 (1933).

[9] J. H. Dillon, *Physics*, 7, 73 (1936); A. H. Nellen, *Ind. Eng. Chem.*, 29, 886 (1937). A. H. Nellen and C. E. Barnett, paper presented at the Rubber Division, A. C. S., Detroit, Mich., Mar. 28-29, 1938.

[10] G. J. Albertoni, *Ind. Eng. Chem.*, (*Anal. Ed.*), 9, 30 (1937); C. E. Barnett and W. C. Mathews, *Ind. Eng. Chem.*, 26, 1292 (1934).

[11] P. Lüpke, Jr., *Vanderbilt News*, 3, 6, 10 (1933).

[12] F. L. Yerzley, *Ind. Eng. Chem.*, (*Anal.* Ed.), 9, 392 (1937).

[13] J. M. Huber, Inc., *Evaluating Carbon Black*, pp. 24-26 (1937).

[14] L. V. Cooper, *Ind. Eng. Chem.*, (*Anal. Ed.*), 5, 350 (1933).

[15] R. S. Havenhill and W. B. McBride, *Ind. Eng. Chem.*, (*Anal. Ed.*), 7, 60 (1935).

[16] E. T. Lessig, *Ind. Eng. Chem.*, (*Anal. Ed.*), 9, 582 (1937).

coupling between two parallel horizontal plates mounted on concentric vertical shafts so that rotation of the top plate is transmitted to the lower through the rubber test piece. A load is applied to the upper plate to compress the test piece between the two plates, and another load is applied at the same time to the lower plate to deflect it horizontally, throwing the two plates off center. The eccentricity of the two rotating plates causes the rubber test piece to undergo, while under compression, a series of severe twisting distortions which produce in time a sharply defined "blow-out" or failure, the time varying surprisingly with the type of carbon black used.

Table 1 shows the time required for eight rubber-grade channel-process carbon blacks to fail in the St. Joe flexometer. The time ranges from 18 to 104 minutes, and the cause for so wide a range must be differences in inherent characteristics of the blacks tested.

TABLE 1. RESISTANCE OF A CARBON BLACK COMPOUND TO REPEATED DISTORTIONS UNDER COMPRESSION IN ST. JOE FLEXOMETER*

Compound

Smoked sheet	100
Zinc oxide	5
Sulphur	2.75
Mercaptobenzthiazole	1.25
Stearic acid	4
Pine tar	3.5
Phenyl-β-naphthylamine	1.5
Carbon black	50.5
	168.5

Press Vulcanization 85 Minutes at 126.1° C.

Carbon Black†	Minutes to Reach Vertical Deflection of 0.90-Inch	Minutes to Reach Blow-out
A-1	17.9	18.0
A-2	22.0	27.6
A-3	31.0	37.1
A-4	40.0	52.0
A-5	44.0	60.4
A-6	80.0	88.4
A-7	80.0	95.2
A-8	88.0	103.8

Test Conditions in St. Joe Flexometer

Vertical load 590 pounds. Horizontal deflection 0.175-inch. Speed of rotation 875 r.p.m. Plate temperature at start 53° C. Grain direction, concentric with axis of test piece.

*J. M. Huber laboratory.
†Channel process, rubber grade.

A second example of a recently developed test to determine differences between carbon blacks is the impact test[17] for measuring the linear indentation and rebound after repeated impacts under pendulum action. The pendulum in the rebound machine[18] is raised to any desired position on the arm between 0° to 30° angle with the vertical. A 15° angle is generally used when testing tire tread compounds. The test piece is positioned so that it just touches the ball on the pendulum when the pointer on the end of the pendulum is at zero on the graduated arm. The test is run by allowing the pendulum ball to strike the test piece until the rebound reading is constant. A spark is caused to jump from an electrode on the end of the pendulum through a sheet of paper to a grounded metal plate. As the pendulum rebounds from the rubber test piece, the spark leaves a graphic record of the angular rebound of the pendulum. The indentation in the test piece is then measured. It is done by determining when two electrical contact points on the machine touch. One point is located below the test piece holder, and the other on the pendulum. Both points touch when the pendulum is in the zero position (vertical). The linear amount of indentation of the test piece and the angular rebound of the pendulum are measured directly and compared with a standard tested at the same time.

Table 2 shows the percentage rebound and the indentation of seven rubber-grade channel-process carbon blacks when tested in the impact machine. The percentage rebound ranges from 59.5 to 64.0, and the indentation from 0.215- to 0.227-inch. These blacks must differ in inherent characteristics to account for the wide range in energy rebound and for the difference in dynamic hardness as measured by the indentation.

TABLE 2. RESILIENCE OF A CARBON BLACK COMPOUND DETERMINED BY IMPACTS OF A PENDULUM*

Compound

Smoked sheet	100
Zinc oxide	5
Sulphur	2.75
Mercaptobenzthiazole	1.25
Stearic acid	4
Pine tar	3.5
Phenyl-β-naphthylamine	1.5
Carbon black	50
	168

Press Vulcanization 85 Minutes at 126.1° C.

Carbon Black†	% Rebound	Indentation Inch
B-1	59.5	0.215
B-2	60.6	0.219
B-3	61.1	0.225
B-4	62.5	0.221
B-5	63.0	0.222
B-6	63.7	0.224
B-7	64.0	0.227

Initial angle of pendulum 15°.

*J. M. Huber laboratory.
†Channel process, rubber grade.

A third example of a recently developed test to determine differences between carbon blacks is the T-50 test,[19] which gives information on the state of vulcanization by determining the temperature at which a previously stretched and frozen (at —70°C.) sample of rubber compound will retract to half of the stretched elongation when gradually warmed. The higher the state of vulcanization,[20] the lower will be the temperature at which the chilled, stretched rubber compound will retract to a given extent. The T-50 test does not select the optimum vulcanization, but it can be used to detect differences in rate of vulcanization. The test is limited to types of rubber compounds which can be stretched.

Table 3 shows how four rubber-grade channel-process carbon blacks compare as regards stress-strain properties, T-50, St. Joe flexometer, and impact tests. It is obvious that C4 is definitely different from the other three blacks. It shows highest modulus, lowest tensile strength, highest state of vulcanization, longest resistance to failure in the St. Joe flexometer, and the highest energy of rebound. There is much closer agreement in the results for the remaining three blacks, with C3 showing lowest tensile strength and best resistance in the St. Joe flexometer.

A fourth example of recent methods for evaluating carbon black is a new application[21, 25] of dielectric test methods for determining differences in carbon-black-rubber compounds. The dielectric constant in particular correlates with the efficiency of dispersion and the range of particle sizes of the black. The finer the particle size, of the carbon black, the higher will be the dielectric constant and conductivity, and the lower the resistivity. These effects are more noticeable with increased loading of the black relative to the rubber. Furthermore poor dispersion of a black produces better dielectric properties than is the case where the same black is well dispersed. Possibly the results obtained with poorly dispersed black would be equivalent to those obtained by using a black of larger particle size.

Additional information has been obtained also as to the surface chemistry of carbon black and its effect on vulcanization of rubber.[22] It is shown that carbon blacks activatedly adsorb oxygen to form an acid complex that retards vulcanization. Carbon blacks contain also organic

[17] J. H. Fielding, *Ind. Eng. Chem.*, 29, 880 (1937).
[18] J. M. Huber, Inc. *Opus cit.*, pp. 28-29.
[19] W. A. Gibbons, R. H. Gerke, and H. C. Tingey, *Ind. Eng. Chem.*, (*Anal. Ed.*), 5, 279 (1933).
[20] J. M. Huber, Inc., *Opus cit.*, pp. 20-24.
[21] A. R. Kemp and D. B. Herrmann, paper presented at Rubber Technology Conference.
[22] F. K. Schoenfeld, *Ind. Eng. Chem.*, 27, 571 (1935).
[25] Cassie, Jones, and Naunton, *Trans. Inst. Rubber Ind.*, 12, 49 (1936).

TABLE 3. STRESS-STRAIN, T-50, FLEXING, AND RESILIENCE DATA FOR A CARBON BLACK COMPOUND*

Compound	
Smoked sheet	100
Zinc oxide	5
Sulphur	2.75
Mercaptobenzthiazole	0.875
Stearic acid	4
Pine tar	2.5
Phenyl-β-naphthylamine	1.5
Carbon black	50
	166.625

Carbon Black†	Modulus at 400% Sq. In. Lb.	Tensile Strength. Sq. In. Lb.	Elong. %	T-50 (°C.)	Blow-out Time, St. Joe Flex. (Min.)	Rebound %	Rebound Indent. (Inch).
		Press Vulcanization 30 Minutes at 134.4° C.					
C1	1440	4150	690	7.6	....	Undetermined	
C2	1440	4210	683	8.3	....		
C3	1420	3910	685	9.1	....		
C4	1580	3860	653	6.0	....		
		Press Vulcanization 45 Minutes at 134.4° C.					
C1	1850	4350	660	0.5	....	Undetermined	
C2	1940	4320	653	1.5	....		
C3	1840	4190	635	2.3	....		
C4	2040	4180	620	— 0.8	....		
		Press Vulcanization 60 Minutes at 134.4° C.					
C1	2120	4330	638	— 5.4	39.8	63.9	.221
C2	2160	4420	642	— 4.0	39.3	63.4	.221
C3	2080	4170	620	— 3.6	52.5	64.2	.226
C4	2300	4090	592	— 6.3	101.0	65.3	.224
		Press Vulcanization 75 Minutes at 134.4° C.					
C1	2340	4250	587	— 8.3	45.0	64.0	.213
C2	2420	4360	598	— 7.4	43.5	64.1	.215
C3	2420	4140	583	— 7.6	63.5	65.1	.220
C4	2420	4090	570	—10.6	133.5	66.0	.216
		Press Vulcanization 90 Minutes at 134.4° C.					
C1	2560	4330	577	—11.0	....	Undetermined	
C2	2460	4410	593	—10.5	....		
C3	2520	4220	575	—10.0	....		
C4	2560	4080	557	—13.4	....		

Test Conditions in St. Joe Flexometer

Vertical load 590 pounds. Horizontal deflection 0.175-inch. Speed of rotation 875 r.p.m. Plate temperature at start 53° C. Grain direction, concentric with axis of test piece.

Initial angle of pendulum in rebound machine: 15°.

*J. M. Huber laboratory. †Channel process, rubber grade.

acids which likewise retard vulcanization.

Information has been obtained also as to the pH values of carbon black[23] and their relation to volatile matter content and accelerator (diphenylguanidine) adsorption.

As several of these new tests, of which the flexometer is a striking example, have been instrumental in differentiating between blacks which by other tests appear alike, it seems possible that further investigation may prove the existence of characteristics which have hitherto been overlooked. It may be possible also, after the accumulation of further data, to correlate the manifold effects of carbon black in rubber with the causes which may be inherent in the carbon black itself.

Without attempting to speculate on these causes, the accompanying Tables 4 and 5 will summarize many of the physical and chemical characteristics of channel-process carbon blacks, the limits of their values, and the influence of these variables on rubber compounds.

Comparatively few of the physical properties of carbon blacks listed in Table 4 have been investigated over a wide enough range to reveal their full significance in rubber compounds. Thus in the matter of fineness, though the particle size of carbon black is fairly well established, yet very little is known about the percentage distribution of the particle sizes, and there is hardly any information about particle size of different rubber-grade channel-process blacks.

The adsorption characteristics of carbon blacks have been extensively investigated, and it has been definitely shown that the adsorption of accelerators will affect the rate of vulcanization. However the question of adsorption of sulphur is still a moot point. When adsorption does occur[22] the adsorbed sulphur is inert in the rubber compound. Uncertainty likewise exists as to adsorption of stearic acid.[24]

Blacks are not all wetted alike by rubber, as is evidenced when attempts are made to mix in the maximum volume loading.[26] There is therefore need of further investigation of the wetting characteristics of carbon blacks and correlation of the results with their influence on rubber.

According to the analysis of the chemical characteristics of carbon black in Table 5, it appears that where a definite influence on the rubber is established, it is the rate of vulcanization which generally seems to be affected. Other conditions in the rubber compound, either in its mixing and processing or in its durability after cure, are unquestionably influenced to some extent. But this can be established only by further study of the chemistry of carbon blacks, and efforts should be made to determine what chemical differences, if any, exist between different rubber-grade channel-process carbon blacks. Additional information should be obtained as to organic impurities in these blacks, as to the carbon-oxygen complex claimed to exist on their surfaces, and, finally, as to the nature and composition of the volatile matter.

Summary and Conclusions

Differences in behavior of channel-process carbon blacks in rubber compounds make it necessary to estab-

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[24] F. H. Cotton, *Trans. Inst. Rubber Ind.*, 6, 248 (1930); C. R. Park and V. N. Morris, *Ind. Eng. Chem.*, 27, 582 (1935); D. Parkinson, *Trans. Inst. Rubber Ind.*, 5, 263 (1929).

[26] N. Goodwin and C. R. Park, *Ind. Eng. Chem.* 20, 621 (1928).

Table 4. Physical Characteristics of Carbon Black and Their Significance

Property	Limits of Values[27]	Influence of Variable on Rubber Compounds
ADHESION TENSION		
Water against carbon	40.72-49.13 dynes per cm.; 41.22-50.34 dynes per cm. for thermal decomposition black[28]	
Benzene against carbon	65.96-81.08 dynes per cm.; 72.19-80.47 dynes per cm. for thermal decomposition black[28]	
ADSORPTION		
Acetic Acid	K value 2.90-3.25 for channel-process blacks K value 0.26 for an inactive black K value 0.74-1.10 for oil blacks[52]	
Hydrochloric Acid	0% for an ink black 3% for a rubber black 12% for a color black[53]	
Potassium Hydroxide (per g. black)	0.0043-0.0065[51]	The higher the adsorption. the slower the rate of vulcanization
Accelerators (per g. black)		
Diphenylguanidine	0.0183-0.524 g.[29] 0.039-0.101 g.[30] 0.0109-0.0156 g.[5] 19.3-42.2%[31] 0.008 g. for thermal decomposition black to 0.101 g. for high color channel black[30]	The higher the adsorption the slower the rate of vulcanization
Mercaptobenzthiazole	0.0266-0.0400 g.[29] 0.030 g. for rubber channel black to 0.131 g. for high color black[30] 0.004 g. for thermal decomposition black[30]	
Hexamethylenetetramine	0.0007-0.0058 g.[32]	
Oil, Linseed (c.c. per g. black)	Averages 1.45 c.c. 0.46-1.0 for thermal decomposition black[33]	Conflicting opinion as to possible correlation with any physical characteristics in rubber.
Organic dyes (per g. black)		
Methylene blue (0.0007%)	0.04 g. for a rubber black 0.17 g. for a high color black[36]	Conflicting opinion as to possible correlation with any physical characteristics in rubber.
Methylene blue (0.01%)	0.00102-0.0255 g.[34]	Conflicting opinion as to possible correlation with any physical characteristics in rubber.
Malachite green (0.05%)	0.035-0.05 g. for rubber black 0.005 g. for thermal decomposition black[32]	Conflicting opinion as to possible correlation with any physical characteristics in rubber.
Iodine (per g. black)	0.104-0.171 g.[29] 11.4-18.8%[35] 26.3-71.4% for color blacks[35]	Conflicting opinion as to possible correlation with any physical characteristics in rubber.
	0.09 g. for rubber channel black to 0.20 g. for high color black[30] 0.05-0.06 g. for thermal decomposition black[30]	Conflicting opinion as to possible correlation with any physical characteristics in rubber.
Rubber in benzene		
0.09% concn.	4.89% adsorbed by carbon black	
0.23% concn.	21.52% adsorbed by carbon black[54]	
1% concn. and in presence of phenol or benzoic acid	Reduction in ability of carbon black to adsorb phenol or benzoic acid[37]	Powerful adorption of rubber upon the surface of carbon black [37]
12 vol. % loading of carbon black on the rubber	100% diffusion of the black with the rubber[36]	Adsorption of rubber on the black
20 vol. % loading of carbon black on the rubber	No diffusion of the black[36]	Formation of new gel structure which assumes character of vulcanized rubber[36 37]
Gases	Undetermined	Adversely affect tinting strength[38]
Sulphur (Heated with equal weight of black)	Adsorption occurs,[22] but limits are undetermined.	Adsorbed sulphur is inert
1% sulphur in benzoic acid-benzene solution.	No adsorption occurs[37]	
Sulphur in benzene (0.7%)	No adsorption occurs[39]	
Benzoic acid (per g. black)		
0.50164 g. in 100 c.c. benzene 7.22743 g. in 100 c.c. benzene	0.01907 g. for rubber black[37] 0.08054 g. for rubber black	
Phenol (per g. black)		
0.12786 g. in 100 c.c. benzene 1.68386 g. in 100 c.c. benzene	0.00183 g. for rubber black 0.03724 g. for rubber black[37]	
Stearic acid (per g. black)		
1% stearic acid in benzoic acid-benzene solution	No adsorption occurs[37]	
In rubber	Adsorbed as a monomolecular layer on the carbon black particles[40]	Polar end of stearic acid molecule is adsorbed on the carbon while the hydrocarbon chain dissolves in the rubber, thus forming a firm bond between the carbon black particle and the rubber matrix
COLOR		
Visual	From dark grey to jet black	Influences color of rubber.
Nigrometer[41]	18.3-38.3[42]	Also an indication of fineness.
FINENESS	Of colloidal dimensions, average estimated to be 0.05 micron.[43] Percentage distribution of particle size unknown. High color black 0.025-micron, rubber grade channel-process black 0.06 micron.[44] Thermal decomposition blacks 0.16-2.22 micron.[44]	The smaller the particle size, the darker the black. The smaller particle size increases reenforcement. Increasing fineness increases adsorptive ability. The finer the particle, the greater the resilient energy and work required to rupture.
WETTING		
Contact angle		
Water against carbon	47°-56° [28]	The larger the contact angle, the less the wetting of the black and the greater the degree of flocculation[45]
Wetting equivalent (per g. black)	1.08 c.c. linseed oil for rubber black 2.14 c.c. linseed oil for color black 0.36 c.c. linseed oil for thermal decomposition black[36]	
Heat of wetting	2.80-4.07 calories per g.; 0.06 calory for thermal decomposition black. Increases with degree of fineness[46]	Higher heat of wetting increases stock temperature in mixing. Possible correlation with extent of surface area
SPECIFIC GRAVITY	Generally 1.75-1.80. Reported as low as 1.68 and as high as 1.95	
SPECIFIC HEAT	0.204 calory per g.[47]	
SURFACE AREA	Unknown; calculated that for spherical particles having average diameter of 0.025-micron, one g. of black will have an area of 6.86×10^6 sq. cm.[48]	The larger the surface, the better the reenforcement

TABLE 4 (Continued)

Property	Limits of Values[27]	Influence of Variable on Rubber Compounds
SUSPENSION (in 0.5% rubber solution in benzene)	4-12% retained in suspension[38]	High carbon in suspension imparts high modulus
STRUCTURE	X-ray patterns show a continuous change from a practically amorphous state to crystalline graphitic state[49]	
TINTING STRENGTH	Narrow	None
VISCOSITY	2.54 seconds for rubber channel black 1.72-2.36 seconds for oil and thermal decomposition black[50]	High viscosity correlated with high reenforcement
VOLUME (apparent)	Uncompressed, 12-15 lbs. per cu. ft. Semi- to fully compressed, 18-25 lb. per cu. ft. Dustless, 22-28 lb. per cu. ft.[44]	Greater bulk may require longer mixing

TABLE 5. CHEMICAL CHARACTERISTICS OF CARBON BLACK AND THEIR SIGNIFICANCE

Property	Limits of Values[27]	Influence of Variable on Rubber Compounds
ACIDITY (pH)	3.3-4.6; 2.8-3.3 for color blacks[28]	The greater the acidity, the slower the rate of vulcanization. Correlates with accelerator adsorption and volatile matter
ASH	0.01-0.15%[51]	A rough measure of the metallic impurities in carbon black
CALORIFIC VALUE (B.T.U. per lb.)	12819-13825; 14550 for thermal decomposition blacks[33]	No correlation with any physical characteristics of the rubber
COMPOSITION[4]		
Carbon	92.3-95.3%	
Hydrogen	0.81-0.97%	
Oxygen	3.89-6.73%	High oxygen content makes poor aging stock[32]
Volatile matter (7 mins. at 950° C.)	2.77-6.23%[35] 4.33-6.82%[30] 2.32-10.74%[31] 4.0-7.5%[51] 7.2-14.0% for color black[28] 0.75-1.30% for thermal decomposition blacks[30]	When blacks are produced from the same natural gas, the one containing a higher V.M. is generally slower vulcanizing
Composition[4]		
Carbon dioxide	1.056-1.735% by weight	
Carbon monoxide	2.805-3.930% by weight	
Nitrogen	0.197-0.448% by weight	
Hydrogen	0.078-0.133% by weight	
Oxygen	0.044-0.117% by weight	
Illuminants	0.028-0.101% by weight	
Methane	0.019-0.048% by weight	
Ethane	0.002-0.005% by weight	
Moisture	Slightly hygroscopic; 0.1-3.0% water removable at 105° C.[51]	
Extractable matter	Less than 0.3%[51]	
Sulphur	Depends on the "sweetness" or "sourness" (i.e. H_2S content) of the natural gas used in the manufacture of the black[41]	
Impurities		
Iron	Occasional traces	The same effect as grit.
Sand	Occasional traces	The same effect as grit.
Carbon-oxygen complex, acidic in character[22]	Undetermined	Retards vulcanization
Organic acids such as anhydrides of mellitic acid and possibly a number of aliphatic and aromatic mono- and poly-hydroxy and aldehyde acids[23]	Undetermined	Act as retarders
GRIT (on 325-mesh screen, size of openings 0.043 mm.)	Less than 0.1%[51]	Grit content as low as 0.1% has no appreciable effect

lish methods of evaluation so as to predetermine the suitability of the black. The early ideas of evaluation centered on physical and chemical tests of the black. This was generally unsatisfactory to the rubber technician because the results were not always in accord with the actual performance of the black in processing or in reenforcement. Therefore the trend has shifted to a study of the behavior of the black in rubber. Many laboratory tests have been devised to study both the unvulcanized and the vulcanized carbon black-rubber compound. The results, however, still did not always correlate with those obtained in actual service. Either the laboratory tests were not sensitive enough, or they did not detect the inherent characteristics in carbon black which affect ultimate service.

Recent trends in carbon black evaluation are to increase the sensitivity of present laboratory tests. Also, new laboratory tests have been developed. These include: (1) the flexometer test, for measuring the rate of heat generation and the resistance to breakdown of a rubber compound subjected to repeated distortions under compression; (2) the impact test, for measuring the linear indentation and rebound after repeated impacts under pendulum action; (3) the T-50 test, which gives information on the state of vulcanization by determining the temperature at which a previously stretched and frozen sample of rubber compound will retract to half of the stretched elongation when gradually warmed; (4) the test of dielectric properties.

The old standards of judging carbon-black-rubber compounds by modulus and tensile strength results are giving

(Continued on page 38)

[27] Limits are for rubber-grade channel-process carbon blacks, except where otherwise specified.
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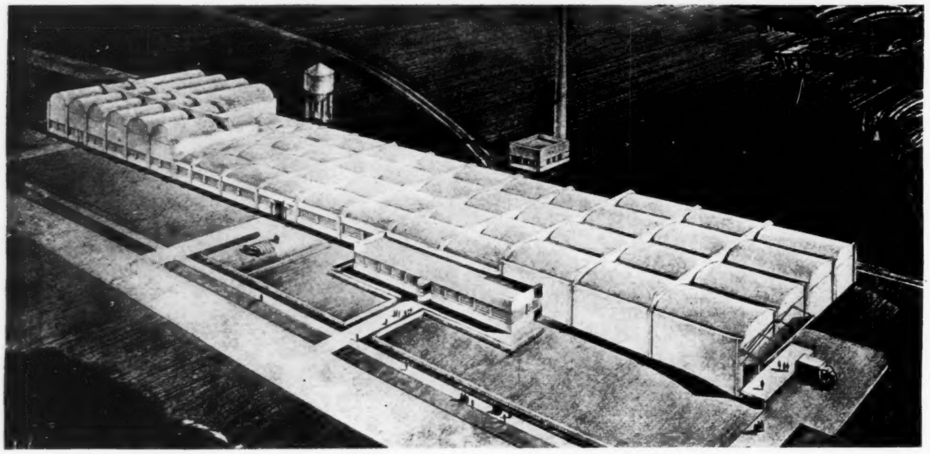
Armstrong's Tire Plant at Natchez, Miss.



THE modern branch factory which the Armstrong Rubber Co., Inc., West Haven, Conn., is building at Natchez, Miss., is nearing completion. With 190,000 square feet and reported to be the largest factory in Mississippi, it will employ about 400 for an initial production of 2,500 tires and tubes a day, with provision for increased production in the future.

The building is of monolithic concrete construction and introduces for the first time in America the Z-D type of roof in tire manufacturing buildings. The Z-D roof is of patented European design, which consists of a series of barrel shaped sections that permit wide spacing of columns. The columns are set on 50-foot centers.

The sidewalls of the new Armstrong plant have already been poured; the trusses on the roof are in place, and within the next few weeks installation of the latest type of machinery for the manufacture of tires will begin.

The building will consist of two-story end sections and a large single-story manufacturing section in the center. One of the two-story end sections will house raw materials, and the other end section will be for finished goods storage. The plant is laid out for straight-line production. Raw materials enter by rail, high line or truck, to the upper story of the raw materials storage section and pass by gravity down through the Banbury mixers and mills and in a straight line through all the manufacturing operations to the finished goods storage section. The finished goods storage section is served by a low line spur track and truck loading facilities. Finished goods will be delivered by a conveyer system to the upper story of the finished goods storage department, from where they will flow by gravity to the lower floor and directly to the low line railroad track and servicing trucks.

Mastication of crude rubber will be done in Gordon plasticators, and all mixing operations in Banbury mixers. The cords will be rubberized on a 28- by 84-inch four-roll calender said to be the largest rubber calender in the world. The cutting and building department will be serviced by the most modern selective bias cutters and the latest design building machines and servicers, all driven with variable speed motors. Rubber from the plasticator will be in live storage on conveyers that can hold a 24-hour production supply. All mixed stocks will likewise be in live storage on conveyers which hold a full day's production and which automatically move the stock to the warming mills.

One of the features of the new Armstrong plant is the elimination of carbon black dust that besets tire manufacturing plants. Carbon black will come by carload from the nearby Louisiana natural gas fields and will be stored in elevated tanks above the Banbury mixers, from where it will flow by gravity through automatic scales, directly into the mixing chambers of the Banbury mixers. The use of soapstone will be eliminated from the plant.

Of particular importance will be the ventilation of the entire plant, and especially that of the vulcanizing department. Plans call for 200 motor-driven ventilator fans in the domes of the barrels of the roof, which are designed for 40 air changes per minute. In the vulcanizing department, which will be equipped with the newest type of individual vulcanizing units, the exhaust fans are more numerous. In addition two large blowers will bring cool air under the floor at the front of the vulcanizing presses. This air will exhaust upward in a thin sheet and will be drawn off by the roof fans. This is on the same principle as the water wall used in fire fighting, except that the wall will be of cool fresh air instead of water.

DC motors, variable speed, through the reduced voltage control method which allows every machine to be brought to the exact speed necessary for the handling of any particular stock, will be used to drive the calenders, Banbury mixers, and extrusion machines. Power for the new plant will be generated from natural gas, of which there is an abundance within 80 miles of Natchez.

Rubber Fillers[1]

F. H. Cotton[2]

IN THE process of rubber manufacture the step of adding fillers chosen from a wide variety of substances has proved to exert marked influences on the manufacturing operations or the properties of the finished product. These fillers are discussed with reference to their effectiveness.

Rubber Compounding

INERT DILUENTS. Even after appreciable mastication, rubber retains some ability to recover after deformation. This results in undue shrinkage after calendering, excessive swelling after forcing through a die, and a characteristic surface roughness which is usually undesirable. By incorporating such fillers as whiting, barytes, slate dust, or certain forms of naturally occurring silica, the internal friction in the plastic rubber may be so increased that the processed stock shows little tendency to retract. Shrinkage of calendered sheet, with its attendant distortion, is practically eliminated, and the desired smooth finish on extruded goods is obtained. These fillers, which have little effect on the physical characteristics of the vulcanized rubber, may perform the additional function of cheapening the mix.

TOUGHENING. China clay, talc, and Kieselguhr have a pronounced toughening and hardening action on both the uncured stock and the vulcanized product. Rigidity is frequently desirable in certain products such as rubber flooring, tiles, rubber covered rollers, buffers, washers, and packing glands. For this purpose the fillers must be free from grit which is liable to spoil the surface, blunt cutting tools, and form potential weak spots from which tears may readily develop. Furthermore they should be dry; Kieselguhr is a bad offender in this respect as it readily absorbs moisture which, on release during vulcanization of the rubber, causes porosity.

REENFORCEMENT. Of reenforcing agents, carbon black is preeminent; whereas zinx oxide, light magnesium carbonate, and refined china clay confer strength to a less degree. The exact mechanism of reenforcement is not clearly understood, but it is known that the finer the particle size, the greater is the reenforcment obtained. There can be little doubt that in some way the rubber becomes bonded with the huge surface exposed by the colloidal filler particles, which thereafter limit the extensibility of the rubber, greatly increase the load it will sustain without rupture, and in some instances have a profound effect in increasing the resistance to tear and abrasion.

Not only the amount of free surface energy, but the character of the filler surface, appears to be of importance in determining reenforcement. Thus, lithopone, an intimate mixture of barium sulphate and zinc sulphide, has a particle size similar to that of zinc oxide, but has far less reenforcing power in rubber. The particle shape is also of significance. Light magnesium carbonate with needle-shaped crystals, china clay, and talc exhibiting plate-like crystals under the microscope produce marked toughness and increase in tensile strength, but confer astonishingly poor resistance to tear in contrast with rubber reenforced with carbon black. Furthermore these fillers with anisotropic particles become alined in the rubber during calendering and extruding and impart a grain effect quite distinct from that resulting from stress in the rubber substance itself. Filler grain produces ease of tearing in the direction of calendering, and resistance to stretching. Unlike the shrinking effect produced on calendering unloaded rubber, filler grain is not completely removed by subsequently warming the sheet.

ACTIVATION. All organic accelerators require the presence of a small percentage of a metallic oxide. Up till the present practically all accelerated rubber mixes have included at least 5% of zinc oxide on the rubber content for this purpose. The reason for this action of zinc oxide is still shrouded in mystery. The writer, in conjunction with J. Westhead, recently investigated the activating influence of a large number of metallic oxides, but found that although not specific to zinc oxide and litharge (a recognized alternative), the property was not shared by all basic oxides. However it was interesting to discover that with many accelerators cadmium oxide gave better results than zinc oxide.

HEAT RESISTANCE. For producing heat resisting hard rubber compounds nothing has yet been found to compare with asbestos, either in the fibrous or powdered condition. Graphite is frequently used in conjunction with asbestos to give packings which will not adhere to hot metallic surfaces under pressure.

COLORING. White pigments comprise zinc oxide, lithopone, and titanium dioxide; white lead cannot be used in rubber because it would react with the sulphur during vulcanization to produce black lead sulphide. White powders like magnesium carbonate, barium sulphate, whiting, and china clay have no pigmentary value in rubber because the refractive index of their individual particles closely approximates that of rubber. In fact certain qualities of light magnesium carbonate may be incorporated in transparent rubber mixes. Nevertheless such fillers of low hiding power are useful in rubber mixes to be colored by means of organic dyestuffs or lakes because they enable the latter to develop full tinting power at very low loadings.

In brightly colored rubber a little white pigment (titanium oxide or lithopone) is desirable to act as a background to reflect the incident light from the interior of the rubber and thus impart brilliance.

Although the modern tendency is toward the use of dyestuffs for coloring rubber, there is still scope for such mineral pigments as iron oxide, red ochre, green oxide of chromium, crimson and orange antimony sulphides, and vermillion, owing to their extreme permanence under the conditions of vulcanization and subsequent exposure to sunlight.

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[1] Abstracted from *Sands, Clays and Minerals,* Apr., 1938, pp. 240-44.
[2] Lecturer in rubber technology at the Northern Polytechnic, London, England.

Latex Compounding

In compounding latex for proofing work, dipping, and molding, fillers are employed as bulking agents to reduce contraction on evaporation of the water and to toughen the resulting rubber film, though it has not been found possible to reenforce latex rubber[3] as may be done with rubber processed by orthodox methods. The best fillers for latex work are those which are readily wetted with water and are of relatively low specific gravity so that they have little tendency to settle from aqueous dispersion. Whiting is often used in cheap mixes for double texture work; while china clay and aluminum flake are used in the production of gloves, toys, boots, and shoes. China clay is particularly adapted for latex work because of its affinity for water which enables a fine clay to remain in suspension indefinitely.

Clay may be used with advantage to thicken a mix and facilitate its application. Small additions of bentonite are particularly valuable in this connection as mentioned by J. N. Wilson.[4] Bentonite has a capacity for absorbing large volumes of water, producing a thixotropic gel, i.e., one that is capable of conversion to a sol by mere shaking and will again set to a gel on standing. China clay and, to a more marked extent, bentonite may confer this property on latex mixes. Research is in progress with a view to employing the phenomenon in commercial latex processes.

Recent rapid developments have been made in the production of latex-cement flooring compositions. Large volumes of *ciment fondu* or light aluminous cement may be mixed with a stable latex such as Revertex without causing coagulation. The resulting paste, usually with the addition of an aggregate such as granulated cork, marble chips, granite chips, or powdered wood, may be spread on an existing foundation to produce a beautiful floor of the terazzo type. There is every probability that within the near future means will be discovered for producing comparable floors from latex and Portland cement, which has a greater tendency to coagulate the rubber dispersion than is shown by aluminous cement. At present latex-cement flooring is being used almost exclusively on ships, but there is every indication that the next few years will see marked developments in this flooring for homes, factories, hospitals, offices, swimming pools, etc.

Developments Foreshadowed

A real need in the industry today is a white filler of low specific gravity showing reenforcing properties equal to or surpassing those offered by carbon black. Such a filler must be of very fine particle size and preferably amorphous. At present the only materials fulfilling these conditions are made in the form of smoke, either by burning natural gas in a limited supply of air or burning metallic vapor as in the production of zinc oxide. In the latter case it has been found possible, by vaporizing the zinc in an electric arc and removing the cloud of oxide by a forced draught of air which quickly cools it to obtain a product of such fine particle size that it reenforces almost as well as gas black; but the disadvantage of high specific gravity still remains. Carbon black is ideal, but for its dirty nature, the way it flies about the factory, the amount of power required to incorporate it with rubber, and the fact that it adsorbs accelerator and retards vulcanization.

Bentonite with colloidal particle dimensions is very difficult to incorporate with rubber and has a pronounced effect in retarding vulcanization. It may be that the presence of water is necessary to the development of colloidal properties in bentonite, as the dispersion on milling with rubber does not appear good.

Some encouragement in the search for a mineral reenforcing filler may be gained from the success of "Bettablack," a processed form of a mineral carbon, mined near Bideford in North Devon. This natural black, which occurs in conjunction with silica, is treated with a slight amount of alkali to reduce acidity and cause peptization of the individual particles. It has proved to give reenforcement equal to that afforded by the best china clay, while imparting superior resistance to tear. Similar highly carbonaceous shales occur in Bavaria, the Tyrol, Spain, Italy, Switzerland, and the anthracite fields of Pennsylvania.

There is scope for further research in the production of rubber fillers by precipitation methods, particularly if during precipitation the surface of the individual particles can be coated with some substance such as a stearate or other soap, which will not only facilitate dispersion in rubber, but may result in increased bonding between the filler particles and the rubber phase. Several surface-treated calcium carbonates of this type are now on the market under the trade name "Kalite," "Calcene," etc. These definitely incorporate easily with rubber on the mill and confer physical properties markedly superior to those given to vulcanized rubber by ordinary whiting. During the past year, a mixture of magnesium and zinc oxide, incompletely carbonated (in the proportion of one molecule of each constituent), has been claimed to have excellent reenforcing properties.[5]

It is conceivable that hydrated colloidal silicates such as china clay which are but partially satisfactory as rubber reenforcers might give excellent results if their individual crystals were sintered or melted and reduced to the spherical shape by blowing as a cloud of fine dust through a furnace. It is strange to find that in the exhaustive reference book on rubber published in 1935 by the Research Association of British Rubber Manufacturers and containing data from upward of 1,400 papers, pamphlets, and books, there is not a single reference to any attempt to use mud as a filler for rubber. Surely in a material carried down by rivers in the form of a colloidal dispersion and frequently precipitated by contact with the electrolyte in the sea, we might expect to have a potential source of reenforcing material for rubber.

[3] Editor's Note. Van Rossem and Plaizier in their paper, "The System Latex-Colloidal Clay. II. Further Investigations on the Influence of Colloidal Clay in Rubber," presented at the Rubber Technology Conference, in London, England, May 23 to 25, 1938 (after the preparation of the above article), disclosed that the addition of a special brand of bentonite reenforces dried vulcanized latex films considerably as indicated by increased tensile strength, modulus, and solvent resistance.

[4] *Sand, Clays and Minerals*, 3, 151 (1937).

[5] B.P. 547,437, Societa Italiana Pirelli.

Evaluating Carbon Blacks

(*Continued from page* 35)

way to the newer standards, for it has been found that rubber compounds may show like stress-strain results, yet differ markedly when evaluated by these newer tests.

There is, however, much to be learned yet about channel-process carbon blacks and their effect in rubber. Further investigation of differences in particle size distribution, surface chemistry, nature of volatile matter, and wetting characteristics of carbon black may enable us to understand more clearly why these carbon blacks differ (1) in processing characteristics, (2) in vulcanization characteristics, such as rate and state of vulcanization, (3) in degree of reenforcement, and (4) in aging characteristics.

Latex Patent Abstracts

CONSTANT progress is being made through developments relating to the treatment of latex to improve its processing properties and, at the plantations, to improve the quality of the crude rubber resulting from the coagulation of the latex. The following abstracts of recent patents indicate some of the more important activities in this direction.

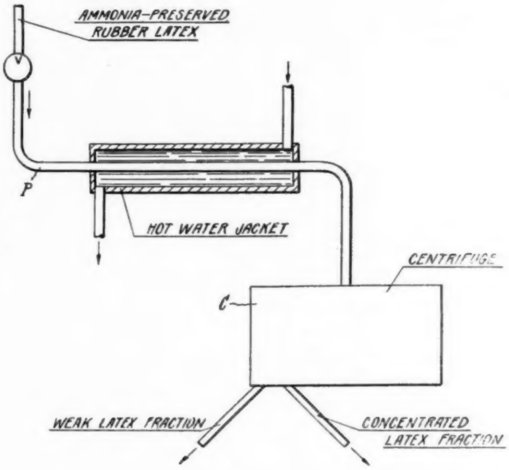
Centrifuging Heated Latex[1]

In concentrating latex by means of a centrifuge, it is obviously desirable to obtain from a given volume of latex the maximum amount of solids in the concentrated fraction, leaving a minimum quantity of solids in the weaker fraction.

By heating latex prior to centrifuging it has been found possible to increase markedly the volumetric ratio of the concentrated fraction to the throughput, and, further, the higher the temperature, the greater this ratio becomes. It is undesirable, however, to heat the latex to a temperature higher than 140° F., for above this temperature a substantial skin of rubber tends to develop on the surface of the concentrated fraction. Thus, by heating latex to a temperature ranging from about 90° to 140° F., it is possible by centrifugal concentration to recover from latex of normal solids content (35 to 40%) a concentrated fraction the volume of which is at least half of the volume of the original latex and the solids content of which is at least 60%. If, on the other hand, the temperature is 60° F. or lower, the volume of 60% concentrate will amount to only about ¼ of the volume of the original latex. This heat treatment will therefore greatly increase the output of the concentrate per unit of time and decrease the amount of weaker-than-normal latex to dispose of, resulting in lower machine and labor costs. The following results are typical of those realized by heating latex to various temperatures and passing it through a typical commercial DeLaval centrifugal machine:

Temperature in ° F.	Throughput (T) in Gallons per Hour	60% Concentrate (C)	Ratio C/T
105	120	63	.525
110	131	76	.580
120	107	63	.581
125	142	83	.584
105	182	93	.510
122	218	118	.541
129	194	106	.546

It may be noted that at different rates of throughput various volumes of concentrate were obtained, but that in all cases the ratio of concentrate to throughput increased with an increase in temperature. It has been found preferable to operate at about 100° to 110° F.



Diagrammatic Process for Hot Centrifuging

From a mathematical consideration of the theory involved it would appear that the magnitude of viscosity at these elevated temperatures is the determining factor in the velocity of separation of the particles or the rate of concentration. Determinations of the viscosity of latex at various concentrations have been made and it has been found that there is a very marked drop in viscosity with increase of temperature.

The rubber latex subjected to concentration in accordance with the present invention is the usual ammonia-preserved type as it comes from the rubber plantations. Inasmuch as continuous heating of latex for an extended time would result in the loss of considerable ammonia, it is preferable to heat the latex only immediately before it enters the sphere of centrifugal action, as shown in the accompanying diagram. Thus, the latex may be delivered from the source of supply through a pipe *P* which is jacketed with hot water, heating the latex to the desired temperature just before it enters the centrifugal machine *C*.

Thickening and Stabilizing Latex[2]

By the addition of a mixture of three organic chemicals which individually produce a different effect, crude or vulcanized latex may be thickened and stabilized. The process which is said to be simple and inexpensive, will produce a consistency of any desired degree up to that of a thick paste with the inclusion in the final goods of such a small proportion of extraneous matter as to be, for all practical purposes, negligible. Thus, it is necessary only to add 0.25 to 2.0% of thickening agent on the rubber solids, depending upon the degree of thickening required and the condition of the original latex. In other processes agents employed for this purpose are required in such a quantity as to affect adversely the properties of the finished goods or to render the latex unstable and difficult to process.

In the present process the mixture comprises an organic destabilizing agent and a fat-derived acid dispersed in water with the aid of a non-volatile dispersing agent. Alcohols of the cyclohexanol type and their esters are used as destabilizing agents; satisfactory examples of these compounds are cyclohexanol, its acetic ester, and any of the isomers of methylcyclohexanol. The preferred destabilizing reagent is a mixture of the three isomers of methylcyclohexanol and cyclohexanol.

Stearic and oleic acids are examples of fat-derived acids suitable for use in this process. For non-volatile dispersing agents neutral bodies such as glycerol and Turkey red oil or non-volatile bases such as triethanolamine are employed. Triethanolamine or glycerol forms a very effective agent with oleic acid and methylcyclohexanol.

[1] U. S. patent No. 2,122,232, June 28, 1938.
[2] U. S. patent No. 2,117,258, May 10, 1938.

The patent sets forth that cyclohexanol and any of the isomers of methylcyclohexanol, when used by themselves, do not produce any definite thickening action, but rather render the latex completely unstable. In order to obtain thickened latex of good stability it appears necessary to use a non-volatile dispersing agent with the acid. When fixed alkali is used with the acid naturally, a soap results; however, excellent results are obtained when using glycerol, a neutral product, in place of the fixed alkali.

As an example of the process, a thickening and stabilizing agent was prepared in two portions as follows:

	Parts by weight
(1) Oleic acid	6.00
A mixture of isomers of methylcyclohexanol	6.25
(2) Triethanolamine	4.00
Water	9.25

Upon addition of two parts by weight of the agent, resulting from the mixture of these two components, to 100 parts of 60% vulcanized latex, a thick stable paste of the consistency of butter was obtained. The addition of the same quantity of the agent to 60% unvulcanized latex gave like, although somewhat less, thickening. Smaller quantities of this agent caused appreciable thickening; while the addition of 1% of the agent to ordinary 40% latex caused sufficient thickening to improve materially its "dipping" properties.

Low Water Absorption Rubber[3]

In the preparation of rubber having low water absorption properties suitable for the insulation of submarine cables, etc., latex is first subjected to treatment for the solubilization of nitrogenous material present, usually by digestion with caustic alkali. The latex is then separated by centrifuging or creaming into two portions: one rich in rubber and poor in non-rubber constituents, and the other low in rubber content, but containing the greater part of the original non-rubber materials. The concentrated, purified latex is diluted to obtain an emulsion of low dry rubber content, and this is coagulated and washed to remove water-soluble materials formed during coagulation as well as residual water solubles remaining in the concentrate after the purification process. The product is then dried; the resulting rubber is non-tacky and contains a very small amount of nitrogenous matter which probably includes natural antioxidants that prevent the rubber from becoming tacky. As an example one general procedure is diagrammatically represented as follows:

Latex
↓
Digestion with Alkali
↓
Creaming
↓
Diluting
↓
Coagulating
↓
Low Protein Rubber

The method of treating latex to solubilize nitrogenous material comprises essentially digestion with 10 to 20 grams of sodium hydroxide per kilogram of latex at about 60° C. for about four days. The amount of caustic, temperature, and time of reaction may be varied, and also a fourth factor, pressure, may be employed. Although caustic is preferred, other alkalies may be used such as potassium hydroxide, ammonium hydroxide, carbonates, and alkali metal phosphates. Solubilization may also be accomplished by treatment with enzymes such as papain and trypsin.

After the alkali digestion and if the next step constitutes creaming, the latex may be stabilized by the addition of a stabilizer soluble in both alkaline and acid solutions, such as sulphonic esters of the higher alcohols, and then partially neutralized with hydrochloric acid. The latex is next purified by either creaming or centrifuging.

Purifying by Centrifuging

It is desirable to centrifuge (wash) the latex at least twice, diluting the concentrate to about 30% solids with water between each centrifuging operation; the concentrate in each case should have a dry rubber content of at least 50%.

As an example of the centrifuging process, natural latex from the trees is treated with 10 grams of NaOH per kilogram of latex and heated at 60° C. for 72 hours. Following this the latex is passed through a centrifuge, and the concentrate diluted to 30% D.R.C. This operation is repeated twice, making three passes of latex through the centrifuge. The latex is then diluted to about 1% D.R.C., and sufficient coagulant such as formic acid is added to recover the rubber from the suspending medium. The coagulum is passed through creping machines with running water until a thin sheet is obtained, which is then dried. The following table gives water absorption values on rubber obtained from the above treatment.

Times Centrifuged	Water Absorption Grams/In²
0	0.010
1	.007
2	.006
3	.005
4	.004

NOTE: The water absorption of normal rubber amounts to 0.015 to 0.020 grams/in².

The water absorption was determined by immersing a sample four inches by one inch by 2¼ millimeters in distilled water for 20 hours at 70° C., wiping dry with a lint-free cloth, and weighing immediately. The difference in weight before and after immersion determines the water absorption. Samples were prepared by pressing the crepe between aluminum sheets in a press at a temperature of 215° F. for 30 minutes.

Purifying by Creaming

If the concentration is to be effected by creaming, the latex is diluted with a considerable amount of water after digestion, and only a single creaming operation is ordinarily required. The dilution with water: (1) decreases the natural tendency of the digested latex to cream and increases the effectiveness of the added creaming agents; (2) reduces the alkali concentration to a more suitable value for creaming; and (3) increases the volume of the serum layer resulting from creaming, thus reducing the concentration of soluble materials which remain in the serum and cream layers. The usual creaming agents can be used such as konnyaku meal, gum tragacanth, and Iceland moss. Those materials effective in low concentrations are desirable because of the smaller amount of water absorbing material added to the latex.

After concentrating by either creaming or centrifuging it is essential to dilute the concentrate (to below 5% D.R.C.) before coagulating. The process is applicable to fresh latex from the trees, preserved latices, and concentrated latices.

[3] U. S. patent No. 2,123,862, July 12, 1938.

Chemistry of Soft Rubber Vulcanization[1]

Reversion and Non-Reversion in Low-Sulphur Compounds

B. S. Garvey, Jr., and D. B. Forman[2]

ACCUMULATION of evidence in recent years has led to a wide acceptance of the view that, chemically, vulcanization is the establishment of cross bonds between the fiber molecules of unvulcanized rubber. The usual concept is that of a chemical cross bond typified by the sulphur bridge,[3] It was recently proposed[4] that "mechanical cross bonds" might be formed by the interlocking of the molecules as they become kinked as a result of *cis-trans* isomerization at some of the double bonds. It was also suggested that free rotation around single bonds might unkink the molecules. This straightening of the molecules would result in reversion of the vulcanized structure.

This theory suggested that a study of reversion would be of value. For this purpose low-sulphur compounds are most suitable because the number of chemically stable sulphur bridges is small. Consideration of the experiments reported here suggests the interesting possibility that in vulcanized compounds there exists a sort of dynamic equilibrium between the formation of cross bonds and their destruction, which results in the maintenance of an adequate number of cross bonds although the individual cross bonds are not permanent.

The general methods of mixing, curing, and testing were previously described.[5] Since PBA and Altax gave the most clear-cut distinctions between reverting and non-reverting types of acceleration, the complete data are given for these two accelerators. Similar tests were made with the other accelerators, but only the conclusions from them are reported here.

Reversion Tests

The base recipe used was:

First latex crepe	100.0
Zinc oxide (lead-free)	3.0
Sulphur	0.5
Accelerator	2.5

The stocks were cured from 5 to 480 minutes at 142° C. (288° F.). Table 1 gives test data for the compounds accelerated with Altax and PBA.

The numbers under "Behavior on Mill" and "Solubility" refer to the classification previously described.[5] The uncured stocks fall in class 0, according to these tests, which shows that they are unvulcanized. The PBA compound after 15 minutes is in class 5 by the first test and class 4 by the second, which indicates that it is well vulcanized. After 480 minutes it is in class 1 by both of these tests, which shows that it is only slightly vulcanized. The retentivity at 100° C. (212° F.), according to the Goodrich plastometer, drops from that of masticated rubber to that of vulcanized rubber and rises again to that of rubber which is only slightly vulcanized. The same is true of the thermoplasticity (P^2_{100}/P_{30}). The rise and fall of the tensile strength and modulus likewise indicate vulcanization followed by reversion. With the Altax compound, on the other hand, all of the data change from those for unvulcanized rubber to those for well-vulcanized rubber and stay there. Little or no reversion takes place.

TABLE 1. DATA FOR COMPOUNDS ACCELERATED WITH ALTAX AND PBA

Cure at 142° C. *Min.*	Behavior on Mill	Solubility	R_{100}	P^2_{100}/P_{30}	Tensile Strength at 600% *Kg. per sq. cm.*	Tensile Strength Ultimate *Kg. per sq. cm.*	Elongation %	Free Sulphur* %
				PBA as Accelerator				
0	0	0	79.4	459.8	..	..	..	..
5	4	3	15.4	1.8	21.1	118.1	925	..
10	5	4	11.0	0.9	24.6	116.0	900	..
15	5	4	24.1	4.1	24.6	140.6	920	..
20	..	..	..	..	..	..	..	0.07
30	4	4	10.9	0.8	18.3	109.7	940	0.01
60	4	4	13.0	1.1	14.8	113.9	1000	..
120	4	4	10.8	1.0	5.6	42.2	970	..
240	3	3	15.4	2.6	11.2	18.3	1200	..
360	2	2	17.0	4.3	7.0	14.1	1120	..
480	1	1	19.5	8.5	3.5	4.2	850	..
				Altax as Accelerator				
0	0	0	81.9	423.0	..	..	..	..
5	1	0	78.8	372.6	..	3.2	1015	..
10	1	1	54.6	145.3	..	4.9	1015	..
15	2	1	25.9	11.4	..	10.9	1000	..
20	..	..	..	..	..	..	..	0.15
30	5	4	9.0	0.8	24.3	99.5	840	0.09
60	5	4	6.7	1.2	45.0	164.5	785	0.01
120	5	4	6.6	0.4	42.2	150.5	800	..
240	5	4	5.7	0.5	35.2	163.1	835	..
360	5	4	5.4	0.3	29.9	148.7	820	..
480	5	4	5.8	0.5	29.1	151.1	850	..

*Method of Oldham, Baker, and Craytor.[6]

Corresponding data for other commercial accelerators led to the following classification:

Reverting Type	Non-Reverting Type
Hexa (hexamethylene tetramine)	Monex (tetramethylthiuram monosulphide)
D. P. G. (diphenylguanidine)	Safex (dinitrophenyl ester of dimethyldithiocarbamic acid)
PBA (polybutyraldehyde-aniline)	Captax (mercaptobenzothiazole)
Vulcone (acetaldehyde-aniline)	Altax (mercaptobenzothiazyl disulphide)
MPT (methylene p-toluidine)	Tuads (tetramethylthiuram disulphide)

Vulcanizing Action of Accelerators

To study the behavior of accelerators alone as vulcanizing agents, sulphur was omitted from the above recipe. The stocks were cured 15, 60, and 120 minutes at 142° C. Only Tuads was sufficiently effective as a vulcanizing agent to develop appreciable tensile strength. Plasticity

[1] Five articles in this series have appeared in *Ind. Eng. Chem.*: 25, 1042, 1292 (1933); 26, 434, 437 (1934); 29, 208 (1937). Presented before the meeting of the Division of Rubber Chemistry, A. C. S., Detroit, Mich., Mar. 28, 29, 1938. Reprinted from *Ind. Eng. Chem.*, Sept., 1938, pp. 1036-39.

[2] B. F. Goodrich Co., Akron, O.

[3] K. H. Meyer and W. Hohenemser, *Helv. Chim. Acta*, 18, 1061 (1935).

[4] B. S. Garvey, *Ind. Eng. Chem.*, 29, 208 (1937).

[5] B. S. Garvey and W. D. White, *Ibid.*, 25, 1042 (1933).

[6] E. W. Oldham, L. M. Baker, and M. W. Craytor, *Ind. Eng. Chem.* (*Anal. Ed.*), 8, 41 (1936).

data, however, show definitely that several accelerators have a distinct vulcanizing action in the absence of sulphur. The test data for the PBA and Altax compounds are given in Table 2.

TABLE 2. VULCANIZING ACTION OF ACCELERATORS WITHOUT SULPHUR

Cure at 142° C. Min.	R_{30}	S_{30}	P_{30}	R_{100}	S_{100}	P_{100}	P^2_{100}/P_{30}
			PBA as Accelerator				
None	34.3	15.0	5.16	79.0	52.0	41.3	330
15	37.8	16.7	6.30	83.2	58.2	48.3	370
60	42.5	18.1	7.8	86.6	62.0	53.6	369
120	39.0	16.5	6.4	85.2	62.6	53.2	442
			Altax as Accelerator				
None	36.1	11.6	4.22	67.2	40.8	27.3	177
15	34.3	13.5	4.60	57.6	39.1	22.5	110
60	31.6	14.1	4.62	53.5	36.5	19.5	82
120	26.8	12.2	3.26	33.5	25.2	8.4	22

For the PBA compound, retentivity, softness, plasticity at 30° and 100° C. (86° and 212° F.), and thermoplasticity all show small increases. There is no evidence of vulcanization. With the Altax compound, however, all of these values drop significantly and give definite evidence of a certain amount of vulcanization, although the compound does not become well cured.

These and similar data permit the following classification of the ten accelerators:

Vulcanizing Type		Non-Vulcanizing Type	
Monex	Altax	Hexa	Vulcone
Safex	Tuads	D. P. G.	MPT
Captax		PBA	

Reclaiming and Recuring

Using the same base recipe as in the reversion tests, a number of tensile sheets containing each accelerator were cured the optimum time. They were then reclaimed by milling on a hot refiner (about 100° C.) for 30 to 60 minutes. The reclaims were cured 15 and 60 minutes at 142° C., both with 0.5% of sulphur (C-cure) and without additional sulphur (B-cure). The cured sheets from the reclaims were in all cases of poorer quality than the original stocks. Test data for the PBA and Altax compounds are given in Table 3.

TABLE 3. EFFECT OF RECLAIMING AND RECURING ON ACCELERATED STOCKS

	Cure at 142° C. Min.	R_{30}	S_{30}	P_{30}	R_{100}	S_{100}	P_{100}	P^2_{100}/P_{30}	Tensile Strength Kg./sq. cm.	E %
				PBA as Accelerator						
Reclaim	None	42.6	41.8	17.8	90.2	78.9	71.2	282	..	..
B-cure	15	39.4	49.0	18.2	80.0	75.0	67.1	247	..	..
B-cure	60	43.4	50.2	21.8	90.0	81.0	73.0	244	..	..
C-cure	15	7.2	8.2	0.6	7.6	8.5	0.6	0.6	105.5	890
C-cure	60	9.8	10.0	1.1	8.4	11.4	0.96	0.84	45.7	920
				Altax as Accelerator						
Reclaim	None	13.0	16.2	2.1	49.3	46.0	22.6	243	..	..
B-cure	15	7.6	11.4	0.87	7.6	12.8	1.0	1.15	42.2	810
B-cure	60	6.7	10.9	0.74	6.6	11.0	0.73	0.72	63.3	850
C-cure	15	6.5	8.3	0.55	8.1	8.7	0.70	0.89	77.3	810
C-cure	60	4.0	9.0	0.36	8.1	9.3	0.76	1.6	84.4	830

The plasticity data show that the PBA stock was well reclaimed and that it did not become vulcanized in the B-cure (without sulphur). In the C-cure (with 0.5% sulphur), however, the compound again became definitely vulcanized, as shown by both plasticity and tensile data. The plasticity data show that the Altax compound, too, was well reclaimed. In this case, however, the compound became vulcanized after both the B- and C-cures, as shown by plasticity and tensile data.

The data from similar experiments with all of the accelerators may be summarized as shown in the tabular at the top of the next column.

Results

These accelerators fall definitely into two groups. Those in the first group show no vulcanizing action in the absence of sulphur, give a reverting stock with low sul-

Accelerator	Initial A-Cure	Reclaim	B-Cure without Sulphur	C-Cure with Sulphur
Hexa	Fair	Good	Very slight	Slight
D. P. G.	Fair	Good	No cure	Poor
PBA	Good	Good	No cure	Good
Vulcone	Good	Good	No cure	Slight
MPT	Poor	Good	No cure	Poor
Monex	Good	Poor	Good	Good
Safex	Good	Good	Slight	Fair
Captax:				
10 min.........	Good	Good	Good	Good
120 min........	Good	Good	No cure	Fair
Tuads	Good	Poor	Good	Good
Altax	Good	Good	Good	Good

phur, and after mill reclaiming require the addition of more sulphur to cure. Those in the second group show definite vulcanizing activity in the absence of sulphur, give a non-reverting stock with low sulphur and after mill reclaiming will cure without the addition of more sulphur. The amino accelerators are all in the first group, and those containing sulphur are in the second group.

Certain individual characteristics of some of the accelerators may also be mentioned.

Hexa is a very slow accelerator, and the slight C-cure is probably due to free sulphur left from the original cure.

Vulcone appears to be a typical reverting accelerator. The results of the C-cure indicate, in addition, that it is somewhat fugitive.

The poor reclaims obtained with Monex and Tuads indicate either that these two accelerators may liberate sulphur and thus give stocks with considerably greater amounts of combined sulphur than the other accelerators, or that they are sufficiently active as vulcanizing agents on a hot mill so that they can counterbalance the devulcanizing action of the milling.

Safex appears to have just enough curing action to prevent serious reversion, but not enough to give a good B-cure. It may be somewhat fugitive.

Mercaptobenzothiazole seems to be a typical curing and non-reverting accelerator, but the B- and C-cures after the 120-minute A-cure indicate it is somewhat fugitive

Theoretical Discussion

The concept of dynamic equilibrium in vulcanized rubber can best be illustrated for these experiments by considering geometric rearrangement (*cis-trans* isomerism) as the mechanism of vulcanization and free rotation at single bonds as the mechanism of reversion. The mobility of the groups within the rubber molecules is in agreement with the kinetic theories of rubber structure.[7]

Geometric rearrangement is assumed to occur during vulcanization and to result in kinking of the fiber molecules of crude rubber which are considered to be comparatively straight. This kinking would result in greatly increased mechanical entanglement—that is, in the establishment of mechanical cross bonds. Free rotation at single bonds under the influence of thermal agitation would permit the kinked fibers to become again comparatively straight. Hence there would be fewer mechanical cross bonds, and the stock would revert.

In low-sulphur compounds it is probable that there are comparatively few of the stable, chemical cross bonds (sulphur bridges) and that most of the vulcanization is by mechanical cross bonds. It might be expected, then, that in long cures such compounds would revert until there remained only that part of the vulcanized structure due to the sulphur bridges. In case this is not true, it may be assumed that there is enough continued vulcanizing action to rekink the molecules as fast as the heat

[7] W. F. Busse, *J. Phys. Chem.*, 36, 2862 (1932); T. R. Griffith, *Can. J. Research*, 10, 486 (1934); E. Guth and H. Mark, *Monatsh.*, 65, 93 (1934); R. Houwink, *Ind. Rubber J.*, 92, 455 (1936); E. Karrer, *Phys. Rev.* [2] 39, 857 (1932); K. H. Meyer, G. von Susich, and E. Valko, *Kolloid-Z.*, 59, 208 (1932).

straightens them out by free rotation. By this equilibrium mechanism the vulcanized structure persists although the individual cross bonds may not.

With certain accelerators vulcanizing action occurs only when free sulphur is present. Low-sulphur compounds with these accelerators are well vulcanized after heating a short time, but revert badly on continued cure. Other accelerators exert definite, but limited curing action without free sulphur. With the latter accelerators in low-sulphur compounds there is rapid curing action until all of the sulphur is combined, after which there is a slow continuation of cure by the accelerator alone which counterbalances the reverting action of thermal agitation. The accelerators exert just enough vulcanizing action to rekink the molecules as fast as the heat straightens them.

These two types are well illustrated by comparing the reverting compound accelerated by PBA with the non-reverting Altax compound. PBA does not vulcanize rubber in the absence of sulphur and does not maintain its curing action after the sulphur is all combined. On the other hand Altax shows a slight, but definite vulcanizing action in the absence of sulphur and maintains its curing action throughout long cures.

In terms of this theory the results in Table 1 may be interpreted as follows: While free sulphur is present during the first 15 to 20 minutes of the cure with PBA, rearrangement (vulcanization) takes place rapidly. After the sulphur is all combined, the rearrangement stops, and the straightening of the molecules under the influence of thermal agitation becomes preponderant. As this action continues, the product reverts until after eight hours the only part of the vulcanized structure remaining is that due to the small number of sulphur bridges. With Altax, after the initial lag period of 10 to 15 minutes, rearrangement is rapid while free sulphur is present, and the product becomes vulcanized. In this case the tendency of thermal agitation to straighten the molecules after the sulphur is all combined is counterbalanced by the vulcanizing action of the accelerator itself. As fast as a kink is lost in one place by free rotation around single bonds, another kink is set up by rearrangement at a double bond so that the number of mechanical cross bonds is fairly constant although the individual cross bonds are not permanent. There is very little reversion, and the product remains well vulcanized even after the eight-hour cure.

Rubber and the 200-Inch Telescope

IN GRINDING the 200-inch mirror for the telescope being built for Palomar Mountain Observatory by the California Institute of Technology at Pasadena, Calif., a number of technical problems were encountered that were solved by the use of rubber. Before attempting the manufacture of the 200-inch mirror that is now rapidly nearing completion, a "pilot" 120-inch mirror was ground to determine the correct conditions for the larger job.

In mounting the glass blank on the bed of the grinding machine, it was found necessary to have a cushioning pad between the glass and the steel bed that would conform to the irregular surface of the glass as it came from the annealing ovens. Otherwise the weight of the glass blank would have set up internal strains within the glass that might have caused errors in the grinding or polishing. After experimenting with numerous types of pads, varying from solid sheet rubber to waxes and gums, a special type of sponge rubber, developed by engineers of The B. F. Goodrich Co., was adopted for this work. Rubber cement was used for cementing the sponge slabs together and to the metal of the grinding table. For protecting the driving mechanism of the grinding equipment from the splash of the abrasive suspension, a special rubber covered sheeting was utilized.

In the rubber-tired wheels which support the revolving dome for the telescope housing, rubber is sandwiched in shear between the vertical web of the flanged steel wheel and the vertical flange directly on the axles. A tubular gasket, approximately three inches outside diameter and made of a special compound of Prenite, a synthetic rubber compound, reenforced with heavy braided cord carcass, is used as a weather-tight gasket seal for the shutters on the dome. Prenite was chosen in preference to rubber because of its long aging characteristics and its ability to maintain almost uniform cushioning and elastic properties under the temperature range that will be encountered in the mile-high elevation of Palomar Mountain.

When mounting the 200-inch mirror on the frame of the telescope proper, it will be necessary to provide a flexible elastic sealing medium that will compensate for the varying coefficients of contraction and expansion between the steel of the glass holder arms and the glass itself. Goodrich Plastikon Putty has been tentatively chosen.

Glycerine Hints

GLYCERINE is an excellent lubricant for use when holes are being bored in rubber stoppers. It will also facilitate easing the glass tubing through the bored stopper. As glycerine is water soluble, it may be readily washed off once the insertion is complete.

Even though glass stoppers or stop-cocks get lost, misplaced, or broken, it is not necessary to discard any apparatus because of such missing parts. Every laboratory has extra stoppers or stop-cocks, and these may be ground to fit the equipment by using a paste of emery powder in glycerine.

Besides the use of glycerine itself as a lubricant for stop-cocks and for interchangeable ground glass parts, also recommended is a combination of glycerine with Bentonite. The viscosity may be adjusted to suit various special needs. This lubricant, moreover, is not affected by nonaqueous solvents, and as the colloidal clay and the glycerine form a jell, the preparation stands up well for long periods even in the presence of water. Furthermore this lubricant may be used at temperatures of 100° C. or better with little change in viscosity.

To keep an automotive vehicle in best condition and cut down maintenance costs, the application of lubricants to all parts of the car is essential. Yet lubricating the rubber shackles, when they develop squeaks, often presents a problem, as oil and grease cannot be used because of their known deteriorating effects which may cause rubber parts to rot. For this purpose a mixture of two parts alcohol to one part glycerine is recommended. The alcohol evaporates after the solution is applied by the usual oil-can method, leaving the glycerine which acts as the anti-friction agent. Besides its function as a lubricant, glycerine is also known to have a beneficial effect upon the rubber, maintaining it in its firm resilient condition and preventing excessive drying. The film of glycerine also acts to protect the rubber parts from the action of gasoline, oil, and grease, because glycerine is not miscible with these substances.

Editorials

Effects of Tire Cord Improvement

FROM the consumer's viewpoint, a tire is composed of two parts, carcass and tread, and he can receive the utmost value for his dollar only when both portions have ceased to be serviceable at approximately the same time. As the tread can be replaced, the carcass, which is largely dependent upon the cord, becomes the predominant factor in tire unit life.

Rayon cord has appeared and for at least some purposes is challenging the heretofore universal cotton. The results of improvements in the treatment and construction of cotton cord are being manifested through longer serviceability. Much is being heard regarding the ultimate supremacy and relative merits of cotton and rayon as a tire cord. As a result of the efforts being exerted under the stimulus of competition between these materials, further developments are probable, and most certainly the final result will be an extension of the life of the tire carcass.

In order to keep pace with this increase in carcass life the tire manufacturer is faced with the problem of producing an original tread that will wear as long as the carcass and thus produce a balanced tire. If the compounder is unsuccessful, the natural outcome will be an increase in tire retreading, thus creating a considerable volume of new business which will necessarily be provided for by either the tire manufacturer or the tire dealer.

Regardless of the final selection as a material for tire cord, advancements have been made recently, and others will follow so that the net result of the service competition, first between cotton cord and rayon cord and second between the carcass and the tread, will be more miles per tire and per dollar for the consumer. This greater service will be a contributing factor to the progress which must take place in any growing industry and will make possible more extended use of the automobile and related rubber products.

Our Forty-Ninth Birthday

THIS October issue of INDIA RUBBER WORLD marks the forty-ninth anniversary of its founding. Tribute is here paid to the thoroughness and thoughtful endeavor with which Henry C. Pearson on October 15, 1889, endowed this publication in such a manner as to make possible such a continued association with and service to the rubber industry. His primary objectives of recording and disseminating authentic and helpful information to those connected with the industry have remained a guiding influence to those who have since been charged with the perpetuation of this comprehensive work.

INDIA RUBBER WORLD wishes to express its appreciation of those who by their productive efforts have made possible the great advancements and expansion in the technology, production, and application of rubber to practical usage and also to those who have generously contributed to the general fund of recorded knowledge which has enabled others to benefit by their experiences. Assisted by the counsel, observations, and contributed information from the ablest specialists in the broad field of rubber activity throughout the world, this journal has achieved its leadership and has established an esteemed friendship of long standing. For the valuable cooperation and for the generous support and consideration of a host of subscribers and advertisers it is deeply grateful, and in return for such encouragement it sincerely pledges itself to strive continuously to make this publication more helpful and more interesting to everyone connected with the worldwide rubber industry.

When another year has passed by, INDIA RUBBER WORLD will have completed a half century of continuous service and will have compiled an uninterrupted history of the important developments and happenings in an industry which has now grown to be an essential factor in present-day livelihood, but an industry which has remained basically dependent upon a single discovery which has withstood the technical and scientific onslaughts of a century. Although the first 50 years undoubtedly appeared strenuous and epoch making to the workers with rubber at that time, the major advancements and expansion will be attributable to the last half-century. In view of the rare collection of facts chronicled within the archives of this journal, it is now anticipated that the October, 1939, issue of INDIA RUBBER WORLD will stimulate reminiscences on the part of the old timers and enable the newer members to evaluate the progress of the rubber industry.

INDIA RUBBER WORLD EXTENDS ITS SINCERE CONSIDERATION to those who suffered injury or loss on the occasion of the hurricane along the Atlantic Seaboard on September 21.

S. C. Stillwagon

EDITOR

What the Rubber Chemists Are Doing

A. C. S. Rubber Division Activities

New York Group

THE fall meeting of the New York Group, Rubber Division, A.C.S., was held on Friday evening, September 16, at the Building Trades Club, 2 Park Ave., New York, N. Y., with 225 members and guests in attendance. Among those present was Jacobus F. Frank, representative of the Netherlands East Indies' government plantation, who was introduced to members by Chairman C. A. Bartle.

Following the dinner, a technical paper by J. H. Ingmanson and A. R. Kemp, of Bell Telephone Laboratories, Inc., 463 West St., New York, on "Effect of Temperature on the Mechanism of Oxidation. II. Coefficient of Oxidation," was presented by Mr. Ingmanson. This paper was based on a study of the effect of temperature on the rate of oxidation of vulcanized rubber, using temperatures of 60° C., 70° C., and 80° C. The experiments were limited to the oxidation range which accounts for a substantial deterioration of physical properties, and physical deterioration was correlated with the quantity of oxygen absorbed. From the investigation, Mr. Ingmanson reported, it had been found that the quantity of oxygen absorbed was a linear function of the time of aging at each of the three test temperatures and that tensile strength and elongation at break decreased as linear functions of the quantity of oxygen absorbed following an initial induction period. Additions of antioxidant to the compound were shown to reduce the rate of oxidation which remains a linear function of time. From the results the temperature coefficient of oxidation was calculated to be 2.38 for each 10° C. increase in temperature over the range investigated. This is equivalent to an 8° C. rise in temperature to double the rate of oxidation which is in agreement with the results of other investigators. Mr. Ingmanson illustrated his talk with slides of the graphs plotted from the results of the experiments.

The next speaker, Inspector E. P. Coffey, Director of the Technical Division, Federal Bureau of Investigation, Washington, D. C., spoke on "Science in Crime," pointing out highlights of the Bureau's work in the scientific investigation of crime. It was apparent from his discussion that the Bureau, with only 25 technicians at Washington, has limited facilities and personnel for the many different types of scientific investigations necessary in tracking down highly organized criminals. To illustrate, Inspector Coffey outlined several different crimes and the widely divergent scientific methods used in their solution. The F. B. I., according to the speaker, has received much outside aid from industrial scientists and laboratories, and he appealed to the technical men present for assistance in the solution of crime problems which may be peculiar to the specialized facilities of the rubber laboratory. Inspector Coffey, an excellent speaker, held the close attention of his audience throughout his interesting discourse.

Chicago Group

THE Chicago Group, Rubber Division, A.C.S., has an interesting program for the fall meeting under consideration, and notices of this meeting will be sent out to members promptly.

Los Angeles Group

THE Los Angeles Group, Rubber Division, A.C.S., will hold its next meeting on October 4 at the Mayfair Hotel. F. S. Carpenter is in charge of details of this event, which will be presented under the auspices of United States Rubber Products, Inc. Eight regular monthly meetings are scheduled this season; the major tire companies will supply the first four programs.

A.S.T.M. Meeting

UNDER the auspices of the Philadelphia District Committee of the American Society for Testing Materials, headed by N. L. Mochel, Westinghouse Electric & Mfg. Co., and R. W. Orr, RCA Mfg. Co., chairman and secretary respectively, a dinner-meeting to discuss research will be held at the Penn Athletic Club on October 17 at 6:30 p.m. Dr. L. W. Chubb, since 1930 director of research at Westinghouse, will speak on "Fundamental Research in Industry." All interested persons are cordially invited to attend. Dinner reservations can be made by writing Mr. Mochel, A.S.T.M., 260 S. Broad St., Philadelphia, Pa.

R. I. Rubber Club

THE Rhode Island Rubber Club's first meeting of the 1938-1939 season was scheduled for Friday, September 30, at the Metacomet Golf Club, East Providence, R. I. To appear on the program were Alan L. Grant, of Charles T. Wilson Co., Inc., 99 Wall St., New York, N. Y., whose subject was to be "Trading in Rubber," and Robert A. Engel, manager, Industrial Aromatics Division of Givaudan-Delawanna, Inc., 80 Fifth Ave., New York, speaking on "Unusual Properties and Uses of Aromatic Chemicals."

The club, which has been in existence 4½ years, has a varied membership composed of both technical and non-technical men. With this in mind the officers have planned four meetings for the coming season along lines intended to be interesting to all members. The outline of these meetings follows: September, 1938, "Rubber Industry as the Business Man Sees It;" December, 1938, "Rubber Industry from the Chemist's Viewpoint;" April, 1939, "Rubber Industry as Seen by the Mechanical Engineer;" June, 1939, "Rubber Industry on a Holiday" (annual outing). To aid members, especially the younger ones, in obtaining positions the club has arranged to have D. C. Scott, Jr., Henry L. Scott Co., Providence, R. I., secretary, receive applications and notices of openings.

Flexible Shellac and Casein

FLEXIBLE shellac and casein, commercially known as Flexilac and Protoflex, are two new chemical reaction products made from bases of shellac and casein, respectively. Flexilac is an orange-colored, non-inflammable, viscous resin that dries rapidly to give a flexible, glossy, adhesive film which is water-soluble, but unaffected by hydrocarbons. Thus it may be used in cements for gaskets exposed to gasoline, naphtha, etc. As the material is soluble in water, it may be prepared readily in a convenient form for inclusion in latex mixes to render the final product more resistant to oil and gasoline, it is claimed. Flexilac is also suggested for use in adhesives, insulation, sizings, and polishes, and for finishing rubber, textiles, leather, metal, paper, etc. It also may be used as a dispersing agent for pigments.

The flexible casein, Protoflex, is a straw-colored transparent jelly which will keep indefinitely without spoilage and will dissolve readily in water without heat. The water solution dries to form a flexible, almost colorless, transparent film. When mixed with latex to the extent of 10 to 15% on the dry rubber content, Protoflex will act as an efficient stabilizer; in larger quantities it increases the tackiness of the final product. Other uses are similar to those indicated above for Flexilac.

Coal Tar Product for Rubber Compounds

Carbitum, a solid hydrocarbon from coal tar, is a new product recently added to the line of ingredients for compounding rubber supplied by Binney & Smith Co., 41 E. 42nd St., New York, N. Y. Both a reenforcing agent and a plasticizer, the new material is said to contribute to the processing properties of uncured rubber, insuring workability of the stock in the various factory operations, and to impart strength and abrasion resistance to the vulcanized article. Carbitum, which finds its widest use in shoe soling, is highly resistant to oils, acids, and alkalies and is supplied in small lumps.

Carbon Black in Alberta

In the Province of Alberta, Canada, has been inaugurated a new industry which may have far-reaching effects. It began in 1919 on a homestead about ten miles northwest of Craigmyle when a farmer, C. R. Echlin, drilling for water, struck a rich supply of natural gas, which eventually was found to be suitable for the commercial production of carbon black. With a few local business men, whom he interested, Mr. Echlin organized Pioneer Carbon Black, Ltd., which drilled two additional wells and erected a small experimental plant for commercial testing of the process.

The Alberta government on June 15, 1934, granted the first permit issued in the Dominion for the production of carbon black. The original owners, however, were financially unable to carry on such an undertaking; so after several changes their lease, rights, and assets were acquired by Premier Carbon Black, Ltd., which uses methods similar to those in the United States. In June, 1937, the new organization drilled a fourth well and started construction of the first "hot house" for the commercial production of carbon black. This building, finished early in 1938, is the first of 16 scheduled for erection.

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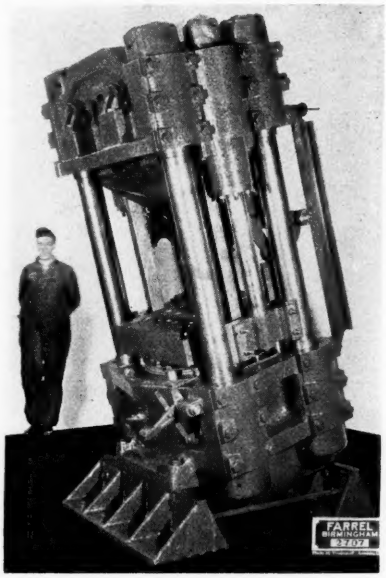
New Machines and Appliances



Farrel Inclined Press

Inclined Molding Press

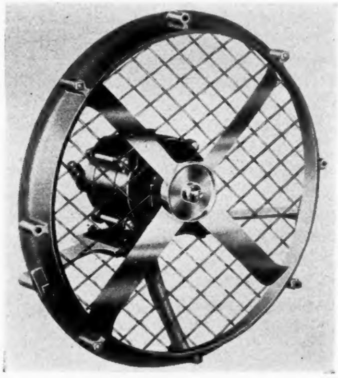
A 1,000-TON inclined hydraulic press for the multi-cavity molding of rubber and plastics provides accessibility to the molds without removal from the press. This feature reduces the time and the amount of labor necessary for cleaning and recharging the molds, and less heat is lost by radiation. The lower platen is inclined at such an angle that easy reach is permitted to the rear edge of the 40-inch molds. This platen is equipped with a knockout device which engages with the pin plate of the bolster and ejects the finished articles. Ejection force and quick opening are provided by push-down rams of 40 tons capacity. Before recharging the cavities the knockout device is disengaged by a foot lever. The lower platen is guided by bronze shoes, adjustable to allow free expansion at the particular working temperature.

When the press opens, the upper platen is lowered at the rear, making it accessible for cleaning and removing vagrant flash. Like the lower platen, this swinging upper platen has "T" slots to enable the bolsters to be bolted in different positions, thus permitting registry of the two halves of the mold. Upon closing of the press, the upper platen with its die is moved to the pressing position at the beginning of the ram stroke; the last several inches of stroke provide a straight approach of the dies. Control of this movement is positive through a rack and quadrant-operated cam mechanism.

The center of gravity of the press, even when the press is closed, is well within the base so that there is positive assurance of stability. Molding of the multi-cavity type demands extreme resistance to deflection in order to reduce the occurrence of rejections resulting from incomplete forming or excess flash. Consequently the crossheads are exceptionally stiff and rugged in construction. In addition the tie rods are large and retain their position accurately. Farrel-Birmingham Co., Ansonia, Conn.

Large-Volume Exhaust Fans

TWO new exhaust fans, designed to effect a rapid movement of a large volume of free air, are applicable wher-



Four-Blade Exhaust Fan

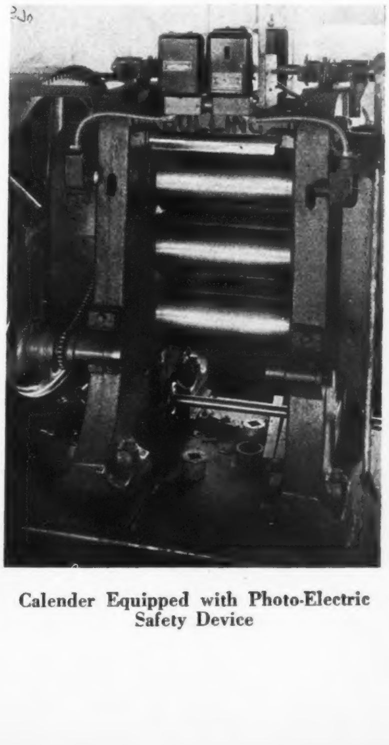
ever a general vapor, fume, or dust condition prevails. These fans, known as Type JG, are equipped with ball-bearing, explosion-proof electric motors, meeting the requirements of Fire Insurance Underwriters. The ½ h.p. motor turns a four-bladed fan at 1,725 r.p.m. to move 6,350 cubic feet of air per minute. Where exhaust volume requirements are somewhat less, the two-bladed fan on the ¼ h.p. motor removes 5,250 cubic feet per minute at the same r.p.m. The fan unit, which is 24 inches in diameter, can be bolted directly to the wall or ceiling or mounted in a panel for use in a window or skylight opening. The blades are of the air foil type, made of highly polished aluminum to provide maximum draught with minimum size and weight. A one-piece galvanized wire screen bolted on the motor side of the fan gives necessary protection when the installation is within reach of persons in the room. Advantages claimed for the new fans are low initial cost, low operating cost, and long life. The DeVilbiss Co.

Calender and Mill Safety Device

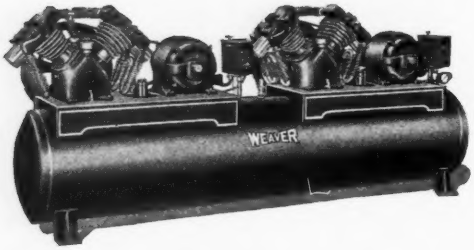
IN ORDER to prevent accidents the calender and the mill used for experimental work in the laboratories of the American Cyanamid Co., Stamford, Conn., have been equipped with photo-electric safety devices which make possible stopping either machine simply by intercepting the beam of light directed at the photo-electric cell. Thus, if the operator or his clothing gets caught in the rolls of the calender or mill, he can stop the machine instantly by waving his arm across the light beam.

The location of the light beam in the case of the mill is above the mill rolls, sufficiently elevated not to interfere with compounding. The safety device on the calender is mounted so that the beam travels across the front of the machine. As this particular calender is designed to run in either direction, a duplicate device is mounted on the other side. In addition to the safety feature the photo-electric unit provides quick stoppage of the calender to reduce damage to fabrics being processed.

The safety device is a General Electric standard photo-electric relay comprising: extended photo-tube holder, standard light source, transformer, and contactor which stops the motor when the light beam is intercepted.

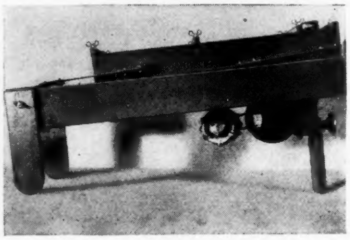


Calender Equipped with Photo-Electric Safety Device



(Right) Vibroplane Screen

(Left) Weaver Dual Compressor



Dual Air Compressor

THE Dual air compressor has a 135-gallon tank on which are mounted two compressor units, each driven by a separate electric motor and controlled by a separate pressure switch. The service compressor unit starts when the tank pressure drops from 175 to 145 pounds per square inch. When there is a large demand for air and the pressure is lowered to 130 pounds per square inch, the second or reserve compressor goes into action along with the service unit. Thus, both compressors are in operation only when the air demands are unusually high. The new compressor is made in three sizes: six, eight, and ten horsepower; the size used depends on the air capacity requirements. Weaver Mfg. Co.

Drill and Grinder Kit

THE Speedway 250 kit, a handy outfit for general utility purposes in the shop, laboratory, and home, comprises a miniature power drill, a small electric grinder, and five accessories, all in a fitted steel carrying case. The drill weighs $2\frac{1}{4}$ pounds and has die-cast zinc alloy handle and incased gear case, the gears running in grease. The body is made of shock-proof, heavy gage steel, finished in baked cracked enamel, and the $\frac{1}{4}$-inch chuck is of the three-jaw type. The grinder, weighing $1\frac{1}{4}$ pounds and operating at 20,000 r.p.m., is shaped to fit the hand and takes standard burrs, cutters, brushes, disks, and wheels with arbors from $\frac{1}{32}$- to $\frac{1}{8}$-inch in size. Both grinder and drill are powered with a series-wound universal motor with a built-in cooling fan. The carrying case, which is finished in matching blue cracked enamel, measures eight by ten by four inches and has a hinged top, fastener, and carrying handle. Speedway Mfg. Co.

Screens for Close Separations

SCREENS for sifting finely divided materials such as carbon black, clay, plastics, pigments, sulphur, and talc comprise a screen box kept in motion by a patented, self-contained reciprocating drive which imparts a smooth motion through a wide range of speeds, reducing the tendency of the screening cloth to blind. The screens, known as Vibroplane, are built in single or multiple deck, open or closed, level or pitched models, depending upon their intended use, and are constructed of aluminum, brass, bronze, stainless steel, wood, or other materials to suit requirements. Besides a reduced tendency to blind, Vibroplane screens are said to provide increased capacity per unit of cloth area, extremely close separations, and low power consumption. Ajax Flexible Coupling Co.

Automatic Batching Scales

SEQUENCE scales, designed to proportion and weigh automatically the separate ingredients of compounds, comprise a combination of scale beams and a dial batcher equipped with two electric-eye controls. In operation the poises on the charging beams are set in accordance with the formula specifications, and the flow of the material from the first storage bin is started by means of a push button control, the conveying being accomplished by gravity flow, screw conveyer, vibrating conveyer, etc. The electric eyes control the motor, magnetic vibrator, valve, or gate, as the case may be. As the quantity of material going into the weigh hopper approaches its set capacity, the first electric eye operates the conveyer mechanism so as to slow down the flow to a dribble feed. When the beam is in exact balance, the second electric eye stops the flow entirely. The remainder of the ingredients are automatically weighed in the proper sequence through the action of interlocking beam controls. The batch may either be dumped automatically when completed or dumped on demand by means of a push button or time switch.

If the source of supply of any ingredient should fail, the operation stops until the supply is replenished, thereby preventing an incorrectly proportioned batch. Owing to an electro-mechanical interlock, it is impossible to start the operation in any but the proper sequence, to "skip" any ingredient, or to start a new batch until the scale is in balance at zero and all controls are in the starting position. It is claimed that an accuracy of better than 1/10 of 1% can be maintained on the individual ingredients and the total of the batch. Buffalo Scale Co., Inc.

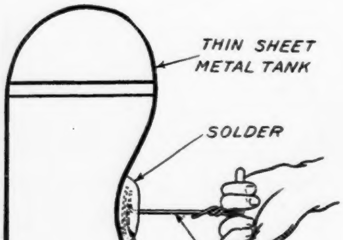
Tank Straightening

THE accompanying sketch shows a method that may be used success-

(Continued on page 53)

Speedway Drill and Grinder Outfit

Buffalo Sequence Scales



Method of Removing Dents

New Goods and Specialties

Neoprene Motor Disk

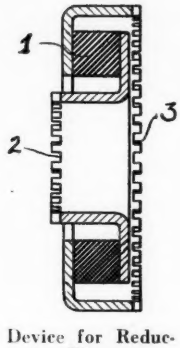
Resilient Connecting Disk

IN MANY modern aircraft engines the magneto drive shaft is connected to the magneto through a resilient molded Neoprene disk which has 19 teeth on one side and 20 on the other. The teeth mesh with steel gears mounted on the magneto drive shaft of the engine and on the drive shaft of the magneto. Any slight variation in alinement between the magneto and the engine is compensated for by the flexibility of the connection The disk also absorbs starting shocks. The use of Neoprene permits the application of this part in direct contact with oil. E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

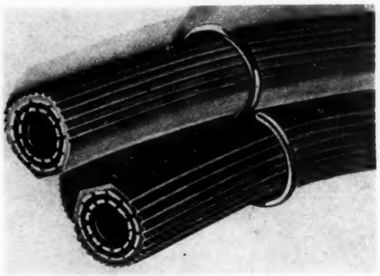
Vibration Reducing Unit[1]

A VIBRATION reducing unit for use between interconnecting parts of machines consists essentially of a rubber ring bonded in shear by vulcanization to inner and outer metal annuli, appearing similar in construction to an ordinary ball bearing, except that the bonded rubber ring is used instead of rotating balls. In the accompanying cross-sectional drawing, the rubber ring is designated as 1, and the shaft and barrel portions of the flanged ferrule are serrated at 2 and 3, respectively, so that the unit may be connected to other similar units. Thus, by mounting these units in multiple any desired degree of angular displacement may be obtained. It is evident from the construction that the inner and outer annuli are capable of moving into positions of non-coaxial relation in addition to providing relative rotative movement. In both cases the rubber ring opposes the movement to dampen vibration.

The units may be mounted as support bearings for shafts, in which case they provide self-alinement and vibra-



Device for Reducing Vibration



Improved Thermoid Hose

tion reduction, desirable in high-speed machinery with unbalanced components. The vibration in the handle of a rock hammer drill may be materially reduced by arranging the units between the handle bolt and handle grips. In shaft connections they will reduce shock and vibration from rotative forces. The units may also be used to provide drive for light shafts requiring universal action.

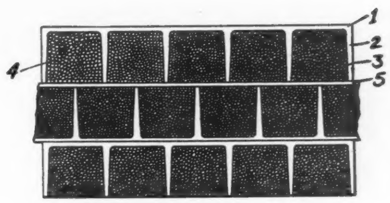
[1] U. S. patent No. 2,101,869, Dec. 14, 1937

Cushioning and Insulating Structure[1]

A COMPOSITE sheet material, when built up into two or more layers, gives a laminated structure of sufficient rigidity with cushioning and insulating (sound and thermal) properties for such uses as flooring, walls, and expansion joints. Referring to the drawing, each composite sheet consists of a solid rubber foundation with projecting rubber ribs 2 and intervening recesses 3 on one face. These recesses may be continuous or set off into small squares and are filled with sponge rubber 4 or other insulating material such as hair, felt, or cork granules. The recessed side is overlaid with a cover sheet 5 integrally formed by vulcanization or adhesively secured to the ribs.

The small dead air cells within the

[1] U. S. patent No. 2,106,943, Feb. 1, 1938.



Cushioning and Insulating Material

structure provide the insulating qualities and also resilient qualities, if the material in which the cells are formed is of inherently resilient material such as sponge rubber. The solid rubber foundation imparts the necessary rigidity to the structure.

Double Weld Hose

ONE of the more recent products perfected by The Thermoid Co. is the Double Weld Hose, which overcomes the handicaps of hose lines that tangle, twist, and generally slow up production. It contains two equal lengths of specially constructed hose, one with a red cover and one with green, bonded together to form a single unit. For attaching to separated fittings, Double Weld Hose may be split into separate hoses for any required distance. Splitting beyond the desired point is prevented by a special clip supplied by Thermoid. Double Weld Hose is ideal for welding and cutting equipment. It is said to be just as flexible as ordinary welding hose.

Rubber Horses

THE motion picture industry has long been a customer of the rubber industry because rubber has been found ideal not only in eliminating noise, an essential detail with talkies, but also in creating replicas of many "props," etc., that might otherwise cause injury during production of the film. The latest such device is the M.G.M. rubber horse.

Heretofore because of the possibility of an accident to a high-salaried star, when the script called for the performer to appear in a close-up astride a horse, the scene either was discarded or a double was used. Both these policies had their disadvantages. Now, however, by the use of intricate machinery in a horse constructed of rubber, technicians and artists have created a new and lifelike animal, which does not reveal its true nature on the screen. They have also solved the problem of taking horses on location. So satisfactory are these horses that rival studios are borrowing them.

Rubber Industry in America

EASTERN AND SOUTHERN

GENERAL business conditions throughout the nation recently improved slightly, perhaps not at the rate previously anticipated; but it is hoped that a real upturn will materialize before the end of the year. Reports on employment throughout the country are encouraging; some sections show no change; while others announce an increase. Inventories continue to drop and will be held at a minimum until a very noticeable improvement sets in, when industrial goods for manufacturing operations will be called for. Yet it is expected that replenishments are bound to be under way before the year-end. Several disturbing factors, however, lie ahead, as the fate of railroads and utilities, results of elections, and the European situation. One authority states, however, that despite the recent and continuing upturn it still seems probable that in statistical terms 1938 will prove the most severe depression year in our history except 1932.

Freight traffic on railroads recently advanced to a new 1938 high, as did the index of machine tool orders. Steel ingot production increased again, to about 44% capacity. Production of 1939 automobile models already has started in most plants. Contracts for heavy engineering construction projects recently also recorded a definite improvement. Crops, moreover, promise big yields.

The shoe industry in August, producing an estimated 41,000,000 pairs, passed its production rate of a year ago for the first time in more than a year, and the high rate continues. The August figure, if borne out, will be the second highest on record, surpassed only by March, 1937, with 46,000,000 pairs. The jump from July to August was 34.8%, one of the sharpest month-to-month gains ever recorded in the industry. This increase in output is felt to be very significant in the trade, as the rise was achieved in the face of extremely cautious buying by retailers; thus production reflected actual consumer demand rather than dealer speculation.

English Engineer Views American Developments

Joseph Brown, technical and sales engineer, of the David Bridge & Co., Ltd., rubber, electric cable, and hydraulic machinery engineers, Castleton, Rochdale, England, sailed September 17 for Europe after a five-week visit to this country during which time he studied the latest developments in rubber processing machinery and manufacturing methods. Although this is Mr. Brown's first visit to this country, he is well known to the rubber trade in Europe and recently spent nine months in Russia.

Traveling with Mr. Brown was Willi Ellerman, chief engineer of the rubber machinery division of Krupp Grusonwerk of Germany, which manufactures the Banbury mixer and Gordon plasticator for German territory. During their stay in this country Messrs. Brown and Ellerman, who visited a large number of rubber manufacturing plants, expressed their appreciation of the great courtesy with which they were received.

The Bridge company, with which Mr. Brown is connected, has the sole manufacturing rights for the Banbury mixer and Gordon plasticator in Europe (except Germany) and the British colonies (except Canada) through an arrangement with the Farrel-Birmingham Co., Ansonia, Conn. Friendly relations have existed between these two firms for the past 25 years. Mr. Brown pointed out that most European rubber factories have accepted the Banbury mixer as a standard and essential machine for processing rubber and have found that its performance on all grades of stocks has been particularly gratifying. The Bridge company also has the sole European and British colonial rights for the manufacture and the sale of tire and tube equipment granted by the National Rubber Machinery Co., Akron, O. In this connection Mr. Brown has been making a careful study of the newer developments and said rapid strides had been made the past year.

Associated with much of the pioneer work on rubber machinery, the Bridge Company, approximately 40 years ago, absorbed the business of John Mills & Co., Oldham, Lancashire, England, which was one of the first manufacturers of rubber machinery. Some of the early drawings and designs of the Mills company were hand painted. Early gears consisted of wooden teeth fastened into a metal rim, as was the practice with gears used on the early English steam engines. It is interesting to note in this connection that there is one small company near Canterbury, England, manufacturing cut sheet tobacco pouches and still using the old John Mills' machines (masticators, washers, and cutting machines). In the early days of the rubber plantation industry Henry Wickham, later Sir Henry Wickham, was in close collaboration with the Bridge company in many of his earlier experiments. The Bridge company has in its possession today three of the original rubber seeds sent by Mr. Wickham from the Amazon to Kew Gardens for the purpose of raising seedlings for transfer to the Malayan peninsula.

Federal Rubber Group Meets in Washington

About three years ago a series of monthly meetings of personnel engaged in Washington departments on work related to the rubber industry was initiated. While no formal organization exists, monthly luncheon meetings have been held quite regularly ever since in the officials' dining room at the centrally located Department of Commerce. Representatives of the Bureau of Foreign and Domestic Commerce, Leather and Rubber Division, the Rubber section of the National Bureau of Standards; the Bureau of Plant Industry of the Department of Agriculture; the Division of Manufactures of the Bureau of Census, the Patent Office; the United States Tariff Commission; and occasional representatives from the office of the Economic Advisor of the Department of State, the Procurement Office of the Treasury Department, and the War and Navy Departments have attended these meetings, which are held on the third Thursday of each month. The meetings grew out of a conversation between E. G. Holt, of the Leather and Rubber Division, and Frank Whitehouse, of the Sundries Division of the Tariff Commission.

On certain occasions when an industry group or individual has some subject to bring to the attention of government employes engaged on work related to the rubber industry, industry representatives have met with the group. The reclaimed rubber manufacturers took advantage of these meetings to discuss the rubber reclaiming industry, and on one occasion showed the moving picture, "Rubber Reborn." At another meeting a representative of the Goodyear Tire & Rubber Co. described to members of the group its rubber plantation developments in Panama and Costa Rica.

Representatives of the Bureau of Standards who attended the recent London Rubber Technology Confer-

ence (L. A. Wood and N. Bekkedahl) reviewed the conference and their traveling experiences at the meeting following their return. At the meeting held September 15, in addition to regular members of the group there were present Dr. H. N. Whitford, of the Rubber Manufacturers Association, Inc., Warren P. Lockwood, assistant trade commissioner recently returned from the London office of the Bureau of Foreign and Domestic Commerce, and Dr. A. M. P. A. Scheltema, Bureau of Agricultural Statistics of the Netherland East Indies government at Batavia.

Power and Mechanical Engineering Exposition

Over 250 exhibitors have thus far engaged space for the Thirteenth National Exposition of Power and Mechanical Engineering which will be held at the Grand Central Palace, New York, N. Y., during the week of December 5. Advance reports indicate a marked interest in this year's show which will present the latest developments in power generation and mechanical engineering equipment.

In displaying steam traps one manufacturer will set up a complete power plant with boiler, reducing valve, open receiver, steam trap, pump, etc., showing the trap under glass in actual operation. Semi-metallic packings and specialty packings, some of which are specially designed to resist oil conditions, will be shown. Displays of insulating materials will include cement, rock wool, asbestos, rubber, and plastic compositions.

Transmission devices will include V-belts, round and flat endless belts, industrial hose, flexible couplings, speed control units, gears, and speed reducers. Among the other equipment on display will be: steam and water meters, automatic proportioning equipment for boiler water conditioning, automatic conveyer scales for proportioning dry materials, CO_2 indicators and recorders, graphited lubricants, and fire-extinguishing equipment.

Safety Masks Approved

The United States Bureau of Mines recently approved the M.S.A. air line respirator and the M.S.A. abrasive mask, both products of the Mine Safety Appliance Co., Pittsburgh, Pa. With this action respiratory protective equipment bearing this approval is available for the first time for operations and processes which expose the worker to harmful dusts and fumes. The air line respirator protects against welding and cutting fumes, paint spray vapors and pigments, fumes from molten or burning metals, and toxic dusts. The abrasive mask affords protection from heavy concentrations of fine dust present in sandblasting and similar operations.

Blank & Stoller

E. G. Holt

Holt Promoted to Chief of Division

Everett G. Holt, who has been Acting Chief of the Leather and Rubber Division of the Bureau of Foreign and Domestic Commerce since 1935, has now been appointed Chief of the Division, according to an official announcement by Dr. Alexander V. Dye, Director of the Bureau.

Mr. Holt obtained his A.B. degree at Colby College, Me., his native state, and his LL.B. at George Washington University. As an expert in technical and scientific fields, he entered the Civil Service Commission in 1917 where he later became Assistant Chief of the Examining Division. Being transferred in 1921 to the newly organized Rubber Division of the Bureau of Foreign and Domestic Commerce, he became Assistant Chief of that Division in 1922 and in 1926 he was made Chief. After spending five months in 1930 with the Goodyear Tire & Rubber Co. as Manager of Foreign and Crude Rubber Research, he returned to his former position as Chief of the Rubber Division in the Bureau of Foreign and Domestic Commerce. When the Rubber and Leather Divisions were merged in 1933, he was appointed Assistant Chief of the combined division and in 1935 was made Acting Chief.

Influenced by the efficiency and untiring efforts of Mr. Holt as Acting Chief, the Leather and Rubber Division has become a source of information recognized for its completeness and accuracy. Through continued expansion of intimate contacts with the industries served he has been instrumental in keeping the industries advised as to new developments in the foreign producing and consuming centers and has enhanced the vigor and effectiveness of all forms of trade promotion. Because of the capable manner in which he has performed the duties of his position, Mr. Holt has not only become a valuable asset to the rubber industry, but also a regular consultant of other Government offices on all matters relating to the leather and rubber industries and the trade in rubber and leather products.

Rubber Products Displayed at Premium Show

The Fourth Annual Atlantic Coast Premium Buyers' Exposition was held at the Hotel Astor, New York, N. Y., from September 12 to 16, inclusive, under the auspices of the Premium Advertising Association of America, Inc., New York. As in past shows, rubber goods were important display items at the exhibit.

Chief rubber exhibit was that of The Barr Rubber Products Co., Sandusky, O., with its display of balloons (novelty, twister, knobby, and spiral types); gas inflated and sponge rubber balls; molded toy novelties; pet items such as scented rubber bones and balls for dogs; etc. Among the novelty balloons were the new popular types with inflatable ears and noses. This year Barr introduced "Tops," a new light-weight dive cap made of latex and which can also be used for shower and household utility purposes. The firm was represented by W. J. Canary, A. D. Benedict, and F. M. Sichel.

A. E. Lindley—Louis Schwarz, 220 Fifth Ave., New York, displayed rubber aprons and bridge covers, products of the Plymouth Rubber Co., Canton, Mass. Rubber door mats of the link type were shown by Natco Products Corp., Providence, R. I. The Eagle Pencil Co., 703 E. 13th St., New York, displayed pencils, fountain pens, etc. Rubber-bladed fans for auto, household, and office were the feature of the exhibit by the Samson United Corp., Rochester, N. Y.

A. L. Siegel Co., 395 Fourth Ave., New York, had on display a wide range of Pliofilm goods including rainwear, bridge covers, shower caps, tobacco pouches, food bags, and Klear-Vu Koverets for dishes.

Price of Neoprene Reduced

Effective September 26, the minimum net price of Neoprene Type M was reduced from 75¢ to 65¢ per pound, and Type G from 80¢ to 70¢ per pound. The price of Neoprene Type E was reduced from 75¢ to 65¢ per pound during August. These prices apply on 200-pound drums only; a slightly higher price is charged for smaller amounts. Neoprene Latex Type 57 is now quoted at 30¢ per pound (wet basis) for 55-gallon standard containers containing approximately 500 pounds. This action taken by E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., is in accordance with the firm's established policy of lowering the price as rapidly as possible, thereby broadening the field of economic utility of Neoprene.

Vulcanized Rubber Co., Morrisville, Pa., is experiencing slack business in hard rubber products, with a general curtailment in the night shifts.

New York Auto Show

The National Automobile Show will be held in Grand Central Palace, New York, N. Y., from November 11 to 18 inclusive. Part of the second floor will be used for the portrayal of scientific research as it is applied in the automotive industry. Some displays will indicate improvements under consideration which may not appear on automobiles for several years and others will be devoted to safety and accident prevention. It is expected that this year's models will show an increasing utilization of rubber as an engineering material.

Capsule for 6939 A.D.

Buried 50 feet in the earth under the exhibit building of Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., at the 1939 New York World's Fair is a "Time Capsule," seven feet six inches long and eight inches in diameter, made by the company. The 800-pound Cupaloy metal envelope, addressed to the people 5,000 years hence, will preserve for their scientists a tangible record of life in our time, including a cross-section of our achievements in science and art, as represented by news reels and books reproduced in microfilm and selected products from laboratories, factories, and cities, as well as the formula for Cupaloy. All these objects are enclosed in a six-foot inner crypt of heat-resistant glass, from which the air had been evacuated and replaced by an inert gas acting as a preservative. The sealed glass tube is wrapped with glass tape and embedded in a waterproof compound.

The rubber objects preserved for posterity follow: a sample of the synthetic rubber Neoprene, product of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., a sample of raw rubber and of Lastex cloth furnished by United States Rubber Products, Inc., New York, N. Y.; transmitter and receiver with cord of ordinary hand-set telephone; cord for Remington Rand electric razor; baseball core; Kroflite golf ball; a section of a modern safety tire prepared by the Fisk Rubber Corp., Chicopee Falls, Mass., the inscription on the back of which reads:

"In 1939, one hundred years after the discovery of the vulcanization of rubber, the safest automobile tire manufactured consisted of a cover or tread of rubber containing a substantial portion of carbon black, supported by multiple layers of cotton cords, insulated from each other by layers of rubber. The tire served as a protector for a thin rubber air container. The tread portion was rendered flexible by the insertion of cross-strips of white rubber, providing increased traction."

U. S. Rubber News

Francis B. Davis, Jr., president, United States Rubber Co., 1790 Broadway, New York, N. Y., in an interview last month during a visit to the company's Los Angeles, Calif., plant, stated the recent rise in business has brightened the future outlook. During the past few months tire replacement sales increased markedly, and from present indications a continuation of this trend is expected. This factor, together with anticipated better original equipment sales for new model automobiles, should, according to Mr. Davis, expand tire sales throughout the rest of the year.

This executive also considered long-range prospects for the industry and said he expects other newly developed uses of rubber to increase sharply during the next few years. He mentioned sponge rubber goods, which, he thinks, some day may consume as much rubber as is now used in making tires. Products mentioned include household mattresses, padding for theater seats, automobile seats, chairs, and similar upholstery uses. This new field, of course, is dependent upon mass production in order to compete in price with existing materials, and the U. S. Rubber president declared his company is devoting its research activities to perfecting suitable processes.

Mr. Davis further stated that if business should continue to improve during the balance of the year as now indicated, directors of the company probably would consider declaring a dividend on the preferred stock during the early part of 1939, after a lapse of a decade, for the financial position and structure of the company have been materially strengthened by the recapitalization plan adopted by the company this year.

Beck Speaks Again on Safety

Ernest W. Beck, supervisor of safety, U. S. Rubber Products, Inc., on September 13, by invitation addressed the first annual meeting of the Federal Interdepartmental Safety Council. His talk, presented before 1,000, including superintendents and heads of federal departments, was on "Organization and Educational Part of Safety." Secretary of Labor Frances Perkins, who called the meeting, reported President Roosevelt's desire to improve the safety experience of governmental departments, which had been found lower than in private industry.

Mud and Snow Tire

The last word in mud and snow tires, according to U. S. Tire Dealers Corp., 1790 Broadway, New York, is "The U. S. Tire," Mud & Snow. With its rugged lug type of tread, this tire is said to have many interesting new features, developed to give the extra traction needed by cars and trucks in "off the pavement" service. The outstanding advantage of the new cleated tread design, company engineers claim, is that it puts more rubber on the ground and provides the car or truck with greater pulling power. The tread design consists of sturdy, staggered lugs, so arranged that the load is uniformly transferred from lug to lug as the tire turns. Besides it has a wide center rib serving to buttress the lugs for extremely hard pulls and assuring uniform wear and smoother riding. The non-skid designed sidewalls and extra-heavy reenforced body construction offer protection against rut wear as well as extra resistance to the severe conditions found in rough, muddy, and rutted roads.

New Patent for Huber

J. M. Huber Corp., 460 W. 34th St., New York, N. Y., assignee of Howard W. Price, has been granted U. S. patent No. 2,127,137, "Apparatus for Treating Finely Divided Powders." The patent discloses the apparatus in use by the Huber company for the conversion of carbon black into granular or dustless form.

N.A.W.M.D Doings

The National Association of Waste Material Dealers, Inc., 1109 Times Bldg., New York, N. Y., will hold its fall convention in San Francisco, Calif., October 17 to 19, at the Hotel Sir Francis Drake. The committee has made elaborate arrangements for those attending, including transportation, entertainment for members, their guests, and womenfolk. All planning to attend this affair should notify headquarters at once. The banquet closing the convention will take place October 19. David Golub, of Charles Harley Co., San Francisco, has been named chairman of the banquet committee, included among whose membership is Irwin M. Desser, of Desser Tire & Rubber Co., Huntington Park, Calif.

Louis Lippa, of Chicago, Ill., announced that the Chicago Dinner Club of the association held a pre-convention dinner meeting in the House On The Roof of the Hotel Sherman on September 29. A group of Chicago members headed by Mr. Lippa is rounding up a substantial delegation from Chicago and the Midwest to go out to the convention on the association's streamline train, the "Forty-Niner," leaving Chicago on October 14.

The third annual golf tournament and outing of the N.A.W.M.D. Luncheon Club, originally scheduled for September 21 at the Green Meadow Country Club, Harrison, N. Y., has been postponed until October 4. The committee in charge of the tournament has secured attractive prizes both for golfers and non-players. The directors' trophy, a beautiful silver cup, donated in 1936 by Julius Muehlstein and won that year by George Burns, of Daniel M. Hicks, Inc., and last year by Abner Koplik, of Castle & Overton, Inc., will

be again in competition. As usual the *Waste Trade Journal* will donate a silver cup. Besides a special golf prize will be offered for the best association golfer attending from outside the metropolitan district.

Armstrong Cork Co., Lancaster, Pa., has announced that F. L. Suter has been elected first vice president to succeed the late Hugh M. Clarke, and Keith Powlison has succeeded Mr. Suter as treasurer.

Ajax Tire & Rubber Corp., 601 W. 26th St., New York, N. Y., has entered into a stipulation with the Federal Trade Commission, Washington, D. C., to stop labeling its tires with any phrases implying that the tires have either six or eight bead-to-bead plies, when such is not a fact. According to the stipulation, the company branded certain of its tires with such phrases as "Silent 6 Six-Heavy Duty" or "Cleated 8 Eight-Extra Heavy Duty," when, in fact, the tires did not have six or eight strips of cord fabric running from the heel of one bead to the heel of the other.

Cementex Co., 336 Canal St., New York, N. Y., recently was formed to market liquid latex, adhesives, and latex compounds. The firm will also engage in physical testing and chemical analyses. Executives include Edward Fox, Robert E. Curran, and Robert J. Kenny. Mr. Fox, a latex technologist with years of experience in the rubber industry, is handling the technical end of the business; while Mr. Curran, a mechanical engineer, is in charge of sales.

Eye Hazard Data Wanted

The National Society for the Prevention of Blindness, 50 W. 50th St., New York, N. Y., requests (1) information concerning new industrial or occupational eye hazards; (2) statistics concerning such hazards; (3) photographs showing either hazards to sight or protection against such hazards; (4) information concerning successful methods of eliminating, counteracting, or alleviating the disease and accident hazards to eyes. This information is desired for consideration in the revision of "Eye Hazards in Industrial Occupations," by Lewis H. Carris, managing director of the society, and Louis Resnick, industrial relations consultant of the organization. Due credit will be given for all photographs and information used either in the new edition of the book or in the society's clearing house of information on the subject.

The society is a non-profit, noncommercial organization devoted exclusively to the interests indicated in its name. Its contribution to industrial accident prevention and health promotion is largely determined by the extent of the cooperation it receives from the groups directly concerned.

Allied News-Photo

Arthur B. Dougall

Sales Manager

When asked to supply information for this sketch, Arthur B. Dougall said, "I feel as though I were writing my own obituary, although I refuse to admit it physically and hope it is not true mentally."

Any one who knows this genial sales manager for Electric Hose & Rubber Co., Wilmington, Del., who has his headquarters at Nine Rockefeller Plaza, New York, N. Y., knows the answer to that statement.

Our victim (for such he seems to consider himself) first saw the light of day on March 10, 1896, in Worcester County, Md. Although born in the South, he completed his formal education in the North, at Union College, Schenectady, N. Y., from which he received his B.A. in 1919, after spending a year in the Army doing his bit to make the "world safe for democracy"—which sounds rather a hollow statement in view of present-day events.

His first job with the rubber industry was as salesman for the Thermoid Rubber Co., Trenton, N. J., in 1925. Five years later he was made sales promotion manager and in 1933, assistant sales manager. The next year, however, he became director of sales, and in 1935, Mr. Dougall was elected also president of the Canadian subsidiary, Thermoid, Ltd., Toronto, where he was in charge of sales, too. But he relinquished these Thermoid connections to accept, in 1936, his present post.

Mr. Dougall belongs to the Sales Executives Club of New York, the Psi U Club, Union Club of New York, and the Springdale Golf Club of Princeton. His hobbies are fishing and golf.

A bachelor, he lives at 160 Springdale Road, Princeton, N. J.

Paul Elbogen & Co., crude rubber brokerage house, 450 Fourth Ave., New York, N. Y., has announced that President Paul Elbogen just returned from the Far East where he visited Singapore, Batavia, Borneo, Kuala Lumpur, Penang, French Indo-China, Colombo, and other small cities. The purpose of this trip was to see the firm's various connections and producers of crude rubber which Elbogen represents in New York.

Atlantic Rubber Products Co. recently moved from 220 Fifth Ave. to 15 E. 40th St., New York, N. Y.

The Rubber Manufacturers Association, Inc., 444 Madison Ave., New York, N. Y., members of its technical committee, held a two-day session on September 15 and 16 at the Trenton Country Club, Trenton, N. J. Harry Fiecker, of Passaic, N. J., presided. Some of the members engaged in golf at the Country Club links.

The Federal Trade Commission, Washington, D. C., has ordered The Perfect Mfg. Co., Inc., 3317 Madison Rd., Cincinnati, O., to cease and desist from certain misrepresentations in connection with the sale of Kar-Nu, a liquid for finishing automobiles, and No-Flatz, a liquid preparation placed in automobile tire tubes to prevent punctures. The respondent corporation sells its products under the trade names of Kar-Nu Co. and No-Flatz Co., respectively. The respondent company is ordered to cease advertising that No-Flatz renders tires absolutely puncture-proof, "ending flat tires forever," that use of the preparation in inner tubes fixes punctures permanently and without patching, and that a hole, resulting from puncture of the inner tube by a nail or other sharp object, will remain completely and permanently sealed. The order also directs discontinuance of the representation that the preparations have been tested and approved by the Automotive Test Laboratory of America or any other purported testing laboratory, unless such products have in fact been scientifically tested in a properly equipped laboratory, under the supervision and direction of qualified technicians.

Tank Straightening

(*Continued from page 48*)

fully in straightening thin, dented or collapsed tanks. This method is recommended in instances where a straightening rod can not be used on the inside, or if it is impractical to apply internal water or other pressure for forcing out the dents.

Make a coil on the end of a wire similar to that shown in the sketch and solder it on to the tank at the dented place. When it is solidly attached, pull with one hand and pound simultaneously around the outside of the dent with a hammer. The dent will usually come out without any difficulty.

After straightening, the solder can be melted off, and the same procedure applied to other existing dents.

MIDWEST

A SPENDING program by the automobile industry, totaling hundreds of millions of dollars, is under way as orders pour forth from Detroit for raw materials and semi-finished parts for 1939 models. Changes in next year's designs have already been indicated by the large expenditures made for major alterations at supply plants throughout the nation. Automotive parts factories have been reemploying workers. New machines, dies, and tools also are required for parts for the new cars. Automotive steel and raw materials, castings, and electrical equipment likewise are in great demand. New England will benefit by orders for fabrics for upholstery; while other parts of the country will supply aluminum, chemicals, paints, etc. The rubber industry, of course, also will share in this spending program. Besides the call for standard items of rubber for a car, orders are coming in necessitating equipment changes in factories producing windshield and door seals and newly developed rubber parts.

The rubber industry made a good showing in a recent survey of employment and earnings in the Midwest district. Thirty-four firms reported 13,029 employes earning $326,000, a 3.4% increase in the number of employed and of 35.9% in the amount of wages from the previous month. In the complete survey 13,207 concerns reported 1,071,336 workers earning $26,844,000, a decline of 2.6%, both in wage earners and in earnings.

Monsanto News

The San Francisco, Calif., district offices of Monsanto Chemical Co., St. Louis, Mo., have been moved to 100 Bush St. Edward Schuler is manager.

Monsanto recently established a district office in the Union Guardian Bldg., Detroit, according to Vice President G. Lee Camp. District manager is H. P. Walmsley, transferred from the Cleveland staff. Maintenance of a sales and technical staff in Detroit will assist Monsanto better to serve the rapidly increasing chemical and plastics needs of the automotive, electrical appliance, pharmaceutical, and other important industries, Mr. Camp declared.

The Plastics Division of the Monsanto company, Indian Orchard, Mass., on September 9 announced the establishment of a St. Louis, district sales and technical assistance office in the Monsanto Bldg., 1700 S. Second St., St. Louis. Joseph E. Gee, formerly of the Chicago staff, is in charge.

The Plastics Division was formerly the Fiberloid Division. According to John C. Brooks, vice president in charge, the change in name was made because of the growing importance of the Indian Orchard plant as a supplier of plastics to the automotive, radio, and other important industries. The Plastics Division's national representation has been expanded to the point where it has district offices, besides the new St. Louis one, at R.C.A. Bldg., New York, N. Y. Tribune Tower, Chicago, Ill.; Union Guardian Bldg., Detroit, Mich.; and 605 W. Olympic Blvd., Los Angeles, Calif. Fiberloid was acquired by Monsanto on April 1, but its former management and personnel were continued without change.

G. P. F. Smith Joins Marbon Corp.

G. P. F. Smith severed his connections with Dispersions Process, Inc., and Naugatuck Chemical Division of United States Rubber Products, Inc., 1790 Broadway, New York, N. Y., effective September 15 to take over new duties with Marbon Corp., 469 E. Ohio St., Chicago, Ill., a subsidiary of Borg Warner Corp., where he will assist in the development of rubber hydrochloride products.

Mr. Smith had been vice president of Dispersions Process, Inc., and general assistant to Elmer Roberts, who is vice president of U.S. Rubber Products, and general manager of the Naugatuck Chemical Division. A dinner was tendered Mr. Smith by his former associates in New York before he left for Chicago.

Gates Rubber Co., Denver, Colo., it is reported, will erect two additions to its factory, for storage and distribution purposes. One structure consists of four stories and basement; the other one story, both 65 by 125 feet, and costing more than $100,000 in all.

Baldwin Rubber Co., manufacturer of molded, extruded, and sheet rubber, Pontiac, Mich., recently added a new building to its plant, for making rubber cement, rubber sealers, and rubber paint. The department, which has a capacity of approximately 8,000 gallons a day, went into operation early in September.

U. L. Harmon, vice president of the Dryden Rubber Co., 1014 S. Kildare Ave., Chicago, Ill., has been named chairman of the Rubber Group in the 1938 campaign of the Community Fund of Chicago. The drive will open October 17 with a goal of raising $3,550,000 for the financing of the 175 major organized social welfare and charitable agencies in Chicago. In last year's campaign, under the chairmanship of Mr. Harmon, the Rubber Group made one of the best showings in the industrial division. Its contributions totaled more than $9,750, or 130% of its quota.

Skelly Oil Co., according to Dr. A. Ernest MacGee, manager solvents sales, has moved its offices from 121 W. Wacker Dr., Chicago, Ill., to 4814 S. Richmond St.

Ford Motor Co., Dearborn, Mich., has started the fall term of its Ford Apprentice School at the plant, for company workmen who desire to qualify as foremen and specialty men by learning more about the theory, design, and maintenance of the machines with which they work. The practical curriculum, kept flexible to meet the changing needs of the industry, this year includes three new courses: body designing, hydraulics, and rubber. The rubber courses are a result of the construction of the new Ford tire plant.

Safety Congress

National Safety Council, 20 N. Wacker Dr., Chicago, Ill., which was organized in 1912, but omitted the congress the first few years of its existence, will hold its Silver Jubilee Safety Congress and Exposition at the Stevens Hotel, Chicago, October 10 to 14, with an attendance of more than 10,000 delegates expected from all over the world encouraged by reports of sustained improvement in the nation's accidents since the last annual congress.

With a panel of more than 500 chairmen, speakers, and discussion leaders the conference will analyze accidents to discover why in the United States last year they cost 106,000 lives and $3,500,000,000. All kinds of accidents, industrial, traffic, public, and home, will be considered.

The exposition, held concurrently, will have more than 130 exhibits, both commercial and contributive, including displays and many working demonstrations. October 11 is Rubber Section Day at the exposition.

Rubber Section Program

AFTERNOON OF OCTOBER 10, STEVENS HOTEL, LOWER LOBBY, COUNCIL ROOM

Opening remarks and annual report by General Chairman J. M. Kerrigan.

"Preventing Windup Accidents," R. S. Farnum, safety supervisor, United States Rubber Products, Inc., Detroit, Mich.

Informal discussion. Led by John E. Lovas, safety supervisor, U. S. Rubber Products, Passaic, N. J.

"Disposing of Alleged Injuries," R. W. Morse, director, Compensation and Safety, The Firestone Tire & Rubber Co., Akron, O.

Informal discussion. Led by Oliver Hopkins, supervisor of safety, U. S. Rubber Products, Providence, R. I.

"Using Watchmen and Janitors to Promote Safety," J. T. Kidney, man-

(*Continued on page* 56)

OHIO

Goodyear Activities

Paul W. Litchfield, president, Goodyear Tire & Rubber Co., Akron, announced, as the result of a recent nation-wide survey, that the purchasing power of 15,260,266 owners of light cars in the United States, about 64% of the country's automobile owners and almost half of the nation's population, has been increased during the past 12 years by $517,000,000 because of improvements in product and method made by the tire industry, resulting today in an annual saving of $33.90 in the tire bill of each individual in the group.

As proof Mr. Litchfield mentioned that tires on light cars today average 26,500 miles of service, against 14,200 miles in 1926; that a tire and tube now costs $19.35, against $23.95 in 1926; that today's tire gives $44.78 worth of mileage on the basis of 1926 values, thus reducing the consumer's tire bill by $25.43 per tire. As the average tire lasts about three years, saving for one year is $8.47⅔, and on four tires for one year is $33.90.

The Goodyear head further stated, "Under the inspiration of a free competitive system, modern business steadily improves the products which it sells to the public and, in one way or another, constantly decreases the cost of those products to the public. Nowhere in the world is there a people so consistently well served. Nowhere in the world is there such a widespread creation and sharing of new wealth.

Farm Broadcasts Begin

Experts on rural problems, beginning September 26, will bring farmers of the eastern, midwestern, and southwestern sections of the country regional crop and market reports over the new Goodyear farm radio news broadcast, heard daily from Monday to Friday over 46 stations of the NBC blue network immediately following the National Farm and Home Hour. These farming authorities include Robert S. Clough, who will broadcast regional farm news from Kansas City; Phil Evans, from Chicago; and Don Goddard, from New York.

Cleaning Retread Matrices

Three methods are suggested by Goodyear for cleaning retread mold matrices.

(1) The aluminum parts of the mold are placed in concentrated nitric acid (65 to 70%) for 20 minutes and then held under running water to remove the acid. By the use of a stiff bristle wire brush the loosened dirt can then be removed from the design. The matrix should be washed again with a cloth to remove any remaining dirt or acid. Rubber gloves, goggles, and a gas mask should be worn when using the acid.

(2) The dirt may be burned from the surface by an acetylene torch. However this job requires a skilled operator, or the aluminum matrix may be burned.

(3) The matrix is removed from the mold when it is hot and laid upon a table with the design up. Gibson soap powder, a strong commercial cleaning agent, is then dusted heavily into the matrix, and a small amount of water poured over the powder. The water will boil, and the design should be thoroughly scrubbed with a fiber bristle brush while the water is still boiling. Then the matrix should be carefully washed in lukewarm water, and if still dirty, the process must be repeated. The operation requires but three minutes, and the cost of the powder is only 5¢ per pound; one pound cleans a dozen matrices.

O'Neil Attended I.R.R.C. Meeting

Trade and industrial conditions in several European countries are being studied by William O'Neil, president, General Tire & Rubber Co., Akron, who sailed early in September from New York on the *Normandie* with Mrs. O'Neil and other members of his family, on a six weeks' tour. Joseph A. Andreoli, of Akron, vice-president of the General Tire & Rubber Export Co., is a member of the party.

As head of one of the "Big Five" companies in America's rubber industry, Mr. O'Neil attended the meeting in London of the International Rubber Regulation Committee on September 12, which decided on a rubber quota of 45% for the final quarter of the year.

Moore Leaves Rubber Service Laboratories Sales Staff

Effective September 1, W. A. (Bill) Moore resigned from the Rubber Service Laboratories Division, Monsanto Chemical Co., Akron, to assume new duties with Sears Roebuck & Co. Following his policy of promoting men within the organization, E. J. Smail, Jr., vice president and sales manager of Rubber Service Laboratories, has announced that J. F. Hand is now covering the territory formerly handled by Mr. Moore.

H. S. Karch, former chief chemist of the Lima Cord Sole & Heel Co., Lima, has been made technical superintendent of the Salem plant of Martin Custom Made Tires Corp.

Firestone News

Harvey S. Firestone, Jr., vice president, Firestone Tire & Rubber Co., Akron, in a recent interview in New York expressed the belief that before the rubber industry lie greater opportunities for development and expansion than ever before, especially in the use of rubber on the farm. He added his company is manufacturing an ever-increasing amount of latex cushion material for mattresses, for sleeping cars and beds, and seats for automobiles, busses, trains, theaters, and furniture generally. The latex, used also in other products, is brought direct from the million-acre plantation in Liberia, of which company Mr. Firestone is the chief executive, whipped into a foam, and molded into the desired form, resulting in sanitary upholstery that will retain its shape and last longer than other materials. According to Mr. Firestone, this field has tremendous possibilities. Firestone also is working on an air spring for automobiles which, it is said, will relace the conventional type of steel spring and shock absorber. Its advantages are providing a controlled and an easier ride, eliminating body roll, and cushioning the car completely on air. Other products with great potentialities mentioned by the rubber executive are traffic markers, rubber thread, adhesives, vibration dampeners for machinery, and a rubber railroad tie plate to reduce the noise and vibration of trains. Mr. Firestone also emphasized the broad new field now opening in plastics and stated a process had been developed which would enable his company to make goods not previously adaptable to plastic material.

Race Winners with Firestone Tires

In both of America's great Labor Day automobile speed classics, the Pike's Peak hill climb and the historic race at Altoona, Pa., Firestone tires scored first-place wins to climax a season of racing triumphs which started on May 30 with their nineteenth consecutive victory in the Indianapolis 500-Mile Race. Louis Unser, of Colorado Springs, roared up Pike's Peak 12½-mile course to set a new record of 15 minutes and 49 seconds. This event marked the twelfth straight Pike's Peak victory for Firestone. The Altoona Race was won by Mauri Rose, the Columbus, O., dirt track ace.

National Association of Foremen will hold its fifteenth annual convention in Goodyear Hall, Akron, on October 14 to 16. About 2,000 foremen and supervisors are expected to be present. H. G. Evans, of production control, Goodyear Tire & Rubber Co., is president of the association. Scheduled among the convention speakers are Paul W.

Litchfield, Goodyear president, and T. G. Graham, vice president, The B. F. Goodrich Co., Akron. Listed among the convention committee members are the following Goodyear men: A. C. Horrocks, E. R. Wolfe, L. B. Tomkinson, J. P. McIntire, J. E. Stafford, S. D. Kramer, and L. D. Hochberg.

Seiberling Rubber Co., Akron, according to John Bunting, advertising and merchandising manager, finds the current business year one of the busiest in its history. Mr. Bunting, in addressing about a hundred Seiberling dealers from North and South Carolina at a meeting on August 25 at the Jefferson Hotel, Columbia, S. C., further declared the company was working four shifts daily on a six-day week. He believes, too, present conditions are unusually good for the independent dealer. Also attending the meeting were Guyton Melton, sales representative at Charlotte, and Grover Crawford, district branch manager at Atlanta.

Goodrich News

The new airplane tires developed by engineers of The B. F. Goodrich Co., Akron, for the tail-skids of giant transport planes are being used for the landing wheels of a miniature speed plane built in San Diego, Calif., which has a wing spread of only 13 feet, yet can fly 200 miles an hour. Though only eight inches high and carrying 40 pounds' air pressure, the standard tail-skid tires are just the right sizes for the midget racer.

Although Leroy Latimer, official airplane tire tester for the Goodrich company has more than 18,000 "perfect landings" to his credit, he only recently took his first plane ride from Akron to New York. By operating the controls of his unique machine in the mechanical laboratory of the company plant at Akron, he simulates actual flight conditions although he never leaves the ground. His job is testing brakes and tires. When he is ready to "land," Mr. Latimer pulls a lever that forces an airplane wheel and tire against a giant flywheel spinning at 65 miles an hour, about the speed at which a transport plane lands. Before his "rocking-chair" pilot job Mr. Latimer had tested bicycle tires by riding a wheel around the racetrack at the Akron fairgrounds.

Personnel Changes

E. F. Tomlinson, until recently in the Chicago, Ill., office of the Goodrich manufacturers' sales department, was transferred to Milwaukee, Wis., in charge of manufacturers' sales, according to G. E. Brunner, general sales manager, original equipment tire division.

John F. Rend, sales supervisor in the Buffalo, N. Y., district, also goes to Milwaukee.

P. E. "Jerry" Tobin, manufacturers' sales in Akron, has been sent to Detroit, Mich., Manufacturers' Sales, and J. T. Callahan, sales supervisor in the New Orleans, La., district, replaces him at Akron.

H. H. Bryant has been named operating manager of the manufacturers' sales department in Akron.

G. K. Hinshaw

Chief Chemist

One of the better known technologists of the rubber industry is George Knight Hinshaw, chief chemist of The Goodyear Tire & Rubber Co., Akron, since 1932. He hails from Bloomington, Ill., (January 13, 1891), where he went to the local elementary and high schools before matriculating at Illinois Wesleyan University. From the latter he received the degree of B.S. (1913) after majoring in chemistry and an M.S. (1915) after specializing in organic chemistry. From 1913 to 1917, Mr. Hinshaw was instructor in chemistry and physics and athletic coach at Pontiac Township High School, Pontiac, Ill. Then he found employment in Goodyear's chemical department.

His name is frequently cropping up in American Chemical Society affairs. He is vice chairman of the Rubber Division, was on its executive committee (1930-31, 1934-35), was chairman of the Akron Section (1933-34) and of the Akron Group (1929). Besides he belongs to the Masonic order and TKE fraternity and has been president of the Goodyear Relief Association (1925 to date). His hobbies are fishing and hunting—and, of course, there's his son.

Mr. Hinshaw resides with his family at 226 N. College St., Hudson, O.

Safety Congress

(Continued from page 54)

ager, employe service division, The Goodyear Tire & Rubber Co., Akron, O.

Informal discussion, led by C. W. Ufford, personnel manager, Ohio Rubber Co., Willoughby, O.

Rubber Mill Safety Problems. (Fifteen-minute talks.) (a) "Safe Disposal of Waste Solvents," E. F. Foran, Goodyear; (b) "Use of Gloves and Sleeves at Mills," R. A. Bullock, personnel director, The Corduroy Rubber Co., Grand Rapids, Mich.; (c) "Prevention of Knife Cuts," W. H. McKay, employment manager, Dunlop Tire & Rubber Corp., Buffalo, N. Y.; (d) "Unusual Accidents," Urban L. Moler, personnel director, Inland Division, General Motors Corp., Dayton, O.

Informal discussion, led by E. W. Beck, supervisor of safety, U. S. Rubber Products, 1790 Broadway, New York, N. Y.

AFTERNOON OF OCTOBER 12, STEVENS HOTEL, LOWER LOBBY, COUNCIL ROOM

Election of 1938-39 Officers.

"The Nurse's Part in Getting Injured Employes Back on the Job," Margaret W. Lucal, R. N., Ohio Rubber Co.

Discussion leaders: Dr. W. S. Ash, plant physician, U. S. Rubber Products, Detroit; Dr. J. Newton Shirley, medical advisor, Arrow Mutual Liability Insurance Co., Watertown, Mass.

Specific Hazards in the Rubber Industry. (Fifteen-minute talks; ten-minute discussions.) (a) "Engineering," D. G. Welch, safety engineer, Hewitt Rubber Corp., Buffalo.

Informal discussion, led by J. M. Kerrigan, manager, industrial relations, U. S. Rubber Reclaiming Co., Inc., Buffalo; (b) "Molding Small Rubber Parts," J. L. Grider, employment supervisor, American Hard Rubber Co., Butler, N. J.; informal discussion, led by R. F. Kinsley, chairman, safety committee, Dryden Rubber Co., Chicago; (c) "Calender and Mill Room," W. W. Stephen, Goodyear; informal discussion, led by A. M. Dietz, Pennsylvania Rubber Co., Jeannette, Pa.; (d) "Hand Tools," Harry A. Walker, safety engineer, Goodyear; informal discussion, led by Paul Van Cleef, Van Cleef Bros., Chicago.

New Incorporations

Anchor Rubber Mfg. Co., 100 W. Monroe St., Chicago, Ill. Capital 2,000 shares common, par value $10 per share. J. Rogers, I. L. Hilderbrand, and L. W. Reinecker, Jr. To manufacture rubber goods.

Liquid Rubber Products Co., 113-15 Frelinghuysen Ave., Newark, N. J. Capital 20 shares, no par value. T. L. Marsh, Midwood Terrace; F. P. Russell, 1 DeWitt Rd., Elizabeth; and C. W. L. Summerill, 38 N. Broad St., Newark, all in N. J. Manufacture boots, shoes, raincoats, and various other rubber products.

Standard Latex Products Corp., Paterson, N. J. Capital 1,000 shares, no par value. F. J. Maywald, Jr. Rubber products.

NEW ENGLAND

GAINS in New England continue. The textile industry is very hopeful; and inventories, high a few months ago, now assume more normal proportions. The shoe business seems generally good; manufacturing operations and retail sales also are about normal for this season. Various other manufacturers report a substantial increase in orders recently.

Farrel-Birmingham Co., Inc., Ansonia, Conn., has begun construction of an additional foundry building at its local plant, to add 4,000 square feet of floor space as part of a program of rearrangement of the Ansonia foundry department for increased efficiency and output. The new construction and rearrangement will be finished in December. Included in the new equipment to be installed is a 15-ton traveling crane, a large molding machine, and a modern sand handling system for the elimination of dust and for reclaiming sand from molds used in the Randupson process.

The Fidelity Machine Co., 3908-18 Frankford Ave., Philadelphia, Pa., according to President H. W. Anderson, has appointed Sidney B. Blaisdell, with offices at 228 Aborn St., Providence, R. I., as New England sales representative. Mr. Blaisdell, a mechanical engineer and graduate of Massachusetts Institute of Technology, was at the main plant in Philadelphia for the last 12 years and as New England representative is prepared to serve manufacturers in the knitting, braiding, clothing, and special textile machine field.

Raybestos-Manhattan, Inc., Bridgeport, Conn., is erecting additions to its brake lining plant at Stratford, Conn., at a cost of $90,000, including a $40,000 office building where the Bridgeport offices will be transferred, a $30,000 steel and brick shipping room, a $12,000 combined garage and laboratory, and an $8,000 frame storage building.

Urges Car Inspection

Replies from 48 State Motor Vehicle Commissioners have been received by Col. Charles E. Speaks, president of the Fisk Tire Co., Chicopee Falls, Mass., in answer to his recent letter urging a program of personal automobile inspection by drivers to reduce the nation's motoring accidents. The replies gave assurance of cooperation through newspaper and radio publicity, which will stress the importance of checking regularly brakes, lights, and tires, particularly during the summer when accidents reach their highest point and tires undergo greatest wear.

Arthur Scrivenor, Jr.

Advertising Manager

Arthur Scrivenor, Jr., advertising manager of The Seamless Rubber Co., Inc., New Haven, Conn., since 1933, was born in Richmond, Va., October 28, 1905. He attended McGuire's University School, Richmond, and Virginia Polytechnic Institute, Blacksburg, being graduated from the latter in 1927 with a B.S. degree after having majored in business administration. He remained at V.P.I., attached to the military department as an instructor in military science and tactics.

The next year Mr. Scrivenor entered the sales promotion department of The Gorham Mfg. Co., Providence, R. I., where he was engaged in merchandising work at the home office and in the retail field. In 1929 he joined the trade and industrial division of Batten, Barton, Durstine & Osborn, Inc., New York, N. Y., as copy writer, later becoming an assistant account representative. Two years later he resigned because of ill health, then during a convalescent period did free-lance promotion work before joining Seamless.

This executive belongs to the Virginia Historical Society, V.P.I. Alumni Association, and the Private Fliers Association. His hobby is aviation, and he holds a private pilot's license.

His home address is 31 Edgehill Rd., New Haven, Conn. He has a son and a daughter.

Footwear Centennial

The year 1938 marks the hundredth anniversary for the city of Providence, R. I., as a rubber footwear manufacturing center. In 1838 Charles Goodyear licensed, under his U. S. patent No. 849, "Improvement in the Manufacture of Gum-Elastic Shoes," granted July 24, 1838, J. W. Clark, of Boston, Mass., and Charles Jackson, of Providence, who established a manufactory at Providence, which business later was carried on by Isaac Hartshorn & Co.

Angier & Earle, Inc., manufacturer of rubber and latex cements, dressings and polishes, bleaches and inks, and other chemical products, 120 Potter St., Cambridge, Mass., according to President Donald Angier, has changed its name to Angier Products, Inc. The general personnel, however, remains the same.

The Black Rock Mfg. Co., manufacturer of rubber cutting and light rubber machinery and contractor for tools, machines, and light manufacturing, Bridgeport, Conn., through G. L. Hammond, president and treasurer, has announced the resignation of J. C. Clinefelter, of Akron, O., as representative in Michigan, Indiana, Illinois, Wisconsin, Ohio, and western Pennsylvania in order that he may devote all his time to the representation of John Royle & Sons, Paterson, N. J.

Lessells on Motor Safety

John M. Lessells, speed friction authority and professor of mechanical engineering, Massachusetts Institute of Technology, Cambridge, Mass., recently returned from a two-month study of British safety measures, stated American traffic safety precautions give domestic motorists a 300% "life expectancy edge" over British riders. In a report to the director of the Elks Traffic Safety Campaign, Professor Lessells, on his study of highway conditions in England and Scotland, revealed that one out of every eight automobiles in Britain is involved in a fatal or serious accident annually, against one in 25 cars for America.

The professor contrasted American and British safety precautions. In this country the emphasis is placed on making every automobile an individual "safety unit" by incorporating into each year's models, from turret to tires, the latest and most thoroughly tested safety features. The British, however, stress improving highway surfaces and educating drivers. Thus now a campaign is being conducted by English traffic officials in conjunction with the Tyre Manufacturers Association, which drive is being bolstered by the threats of fines for motorists who continue to ride on worn and threadbare tires. But in the United States, the traffic expert declared, the incentive to use safe tires is provided by the constant improvement being made in the development of low-cost safety tires. Skid demonstrations and the use of easily understood principles have made the American public "skid-conscious" and should help reduce accidents.

NEW JERSEY

NEW JERSEY rubber manufacturers are encouraged over the slight increase in business during the past few weeks. Although the pick-up was small, manufacturers believe it is the forerunner for better conditions in the fall. A better demand for reclaimed rubber also exists.

Nearpara Rubber Co., Trenton, announces a better demand for reclaimed rubber.

Essex Rubber Co., Trenton, had a very successful trend of business during August, with September holding up very well. An official of the concern said he believed business would show a better trend from now on.

Acme Rubber Mfg. Co., Trenton, reports increased orders for mechanical goods.

Whitehead Bros. Rubber Co., Trenton, is operating normally. Treasurer R. J. Goehrig returned from a business trip through New York State.

Pierce-Roberts Rubber Co., Trenton, finds business gaining, with a better demand for druggists' sundries.

J. A. McQuillen, secretary of the Pocono Co., Trenton, reports that business during August was better than for several months.

The American Hard Rubber Co., Butler, held its fourth annual flower show at Butler High School, September 10 and 11, which was attended by more than 5,000 who viewed the more than 1,000 entries of flowers and plants of all kinds. After the exhibit the flowers were distributed to the sick and shut-ins. A large number of worthwhile prizes were awarded. The show again was under the direction of John L. Grider, factory welfare director of the Butler plant.

W. H. Sayen, executive of the Mercer Rubber Co., Hamilton Square, finds business better in all lines of the rubber industry.

The Carter Bell Mfg. Co., supplier of rubber substitutes and chemicals, which has maintained general offices continuously for the past 35 years at 150 Nassau St., New York, N. Y., on October 14 will transfer these offices to the plant on Morris Ave., Springfield, N. J., to which the company moved its factory from Millburn early this year. The firm believes that with present-day means of transportation and communication this move will prove an advantage to its service to the trade.

The Thermoid Co., Trenton, in a report to employes showing a loss for the first half of 1938, through President Fred Schluter stated, however, "Your company will try to keep its pledge that no further wage cuts on present operations will be made this year. Sales were better in the second three months, but we are still in the red. July was the worst month of the year so far. That means that the remainder of this year is most important to all of us. . . . We have just received figures from the National Industrial Conference Board which they obtained from the records of the United States Government. They show that from 1929 to 1935 in all American industry 21¢ out of each dollar went for salaries, wages and dividends. At Thermoid 28¢ out of every dollar went for salaries and wages. This is 33⅓% more than the average for all American industry."

OBITUARY

Continental by R. M. G., Inc.

Frank Berenstein

Frank Berenstein

A HEART attack on September 10 caused the death of Frank Berenstein, who was president of the following companies: Panther-Panco Rubber Co., Inc., Chelsea and Stoughton, both in Mass.; Panther Rubber Co., Ltd., Sherbrooke, P. Q., Canada; and American Tile & Rubber Co. and Puritan Rubber Mfg. Co., both of Trenton, N. J. The deceased, who was born on May 25, 1874, and had only a grade school education, for a time sold dry goods and clothing; then the rubber heel business attracted his attention. In 1903 he went to the Walpole Rubber Co., Walpole, Mass., and remained with it after it joined with the Foster Rubber Co., Boston, Mass., in 1907. Then the next year, however, Mr. Berenstein started organizing his own companies.

He was well known for his charitable work and was one of the founders of the Hebrew School in Chelsea.

Surviving are his wife, three sons, and three daughters.

Funeral services were held in Chelsea, September 11. Burial was in Woburn.

FINANCIAL

Unless otherwise stated, the results of operations of the following companies are after deductions for operating expenses, normal federal income taxes, depreciation, and other charges, but before provision for federal surtax on undistributed earnings. Most of the figures are subject to final adjustments.

Faultless Rubber Co., Ashland, O. Year to June 30: net profit, $15,329, equal to 23¢ each on 65,450 no-par capital shares against $187,426, or $2.86 a shares, in the previous year.

Pharis Tire & Rubber Co., Newark, O. Eight months to August 31: net profit, $329,339, equal to $1.50 each on 220,000 common shares. Gross sales for the 1938 period totaled $5,220,122, against $4,751,096 in the similar period last year.

St. Joseph Lead Co., 250 Park Ave., New York, N. Y., and subsidiaries. Six months ended June 30: net profit, $46,184 after depreciation, depletion, interest, federal income and excess profits taxes, etc., equivalent to 2¢ a share on (par $10) common. This compares with $4,507,360, or $2.30 a share, in the first half of 1937.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
American Hard Rubber Co.	8% Pfd.	$2.00 q.	Sept. 30	Sept. 16
American Hard Rubber Co.	Pfd.	$2.00 q.	Sept. 30	Sept. 16
Firestone Tire & Rubber Co.	Com.	$0.25	Oct. 20	Oct. 5
Garlock Packing Co.	Com.	$0.25 q.	Sept. 30	Sept. 24
General Electric Co.	Com.	$0.20 q.	Oct. 25	Sept. 23
General Tire & Rubber Co.	Pfd.	$1.50 q.	Sept. 30	Sept. 20
Hercules Powder Co.	Com.	$0.25	Sept. 24	Sept. 13
Hewitt Rubber Corp.	Com.	$0.10	Sept. 10	Aug. 27
Jenkins Bros.	7% Pfd.	$1.75 q.	Sept. 30	Sept. 22
I. B. Kleinert Rubber Co.	Com.	$0.05 extra	Sept. 30	Sept. 15
I. B. Kleinert Rubber Co.	Com.	$0.10	Sept. 30	Sept. 15
Norwalk Tire & Rubber Co.	Pfd.	$4.37½ accum.	Sept. 22	Sept. 16
Norwalk Tire & Rubber Co.	7% Pfd.	$0.87½ q.	Sept. 22	Sept. 16
Pahang Rubber Co., Ltd.	Com.	$0.10	Sept. 24	Sept. 16
Plymouth Rubber Co., Inc.	7% Com.	$1.75 q.	Oct. 15	Oct. 1
Raybestos-Manhattan, Inc.	Com.	$0.15	Sept. 15	Aug. 31

Rubber Industry in Europe

GREAT BRITAIN

I.R.R.C. Export Quota

At a meeting of the International Rubber Regulation Committee, 5-6 Lancaster Pl., Strand, London, W.C.2, held on September 12, the committee fixed the following percentage of the basic quotas for 1938 as the permissible exportable amount: for October, November, and December, 1938, 45%.

Under the scheme of regulation, it is open to the committee to revise its decisions as regards the permissible exportable amount, from time to time, if for any reason this should in its opinion be desirable.

As at present arranged, the next meeting will be held on November 15, 1938.

The Glasgow Exhibition

The Empire Exhibition at Glasgow, about to close, has been very successful and despite the wet weather was attended by many millions of visitors. The Rubber Pavilion shared in this interest, and many demands for objects displayed followed. The domestic applications of rubber appeared to have attracted most attention, although there were also a gratifying number of inquiries for various kinds of industrial products, particularly new applications of rubber and latex.

At the engineering section a full range of rubber joints for metal pipes was displayed including the Victaulic type of joint recommended for installation over rough ground. There were various rubber-lined pumps; one design, the Mono pump, used rubber in the form of a revolving worm drive; in addition were to be seen valves and detachable rubber valve linings, acid resisting linings for chemical plant, models of Linatex all-rubber coal chutes, hard rubber pipes, "Metalastik" rubber-bonded metal for resilient springs, and numerous other articles.

Special attention was drawn by a model jigging screen in which the jigging arms were attached to the frames and screens by "Silentbloc" bearings. These bearings, which require no lubrication, are said to give long life even under most adverse conditions, such as screening coal dust, where the dust causes rapid wearing out of metal bearings.

Another model showed the use of rubber for flexible drives from power units; two motors were connected by a shaft having rubber couplings at each end.

Rubber Courses

The British rubber industry has seen to it that adequate facilities are provided for ambitious young men in the industry to receive instruction in rubber technology or otherwise add to their knowledge of rubber so as not only to prepare them for scientific work, but to help increase their value as assistants in office, laboratory, factory, or as salesmen.

Northern Polytechnic, London, which opened on September 26, as usual offers courses run in collaboration with the Institution of the Rubber Industry. Elementary and advanced courses in rubber technology are provided; in addition special short evening courses, covering about ten weeks, are offered to salesmen and others similarly interested in the rubber industry. Students can work in the Department of Chemistry and Rubber Technology as internal students of the University of London. During the past two sessions 43 academic degrees have been awarded to students of the scientific departments. An influential committee, fully representative of the rubber industry, cooperates with the governors in maintaining intimate contact between the school and the industry.

Besides this instruction basic training in workshop practice and the like is offered to young boys of 13 to 14 years, preparatory to their entry into the rubber industry, by the Rubber Trades School, which receives the active support of practically all sections of the industry. Most London firms have agreed to accept boys trained there. The school course takes up three years of full-time study, after which the boys enter the rubber works; but they are expected to continue their training by attending for three more sessions and not less than two evenings a week. At the end of the full course, which covers five years, students may take the examination of the Institution of the Rubber Industry.

The City of London College offers courses of lectures on rubber of a different type. Beginning September 29 a course of 18 lectures will be held on consecutive Thursday evenings from 6 to 7 p.m. George Rae will give 12 lectures on production and consumption of rubber; there will be two on the marketing of rubber; while four on the character, grades, and defects of raw rubber will be given by F. J. Popham. At the end of the course examinations will be held, and Short Course Certificates awarded to successful students. The best student will receive a prize of five guineas awarded jointly by the Rubber Trade Association of London and the Rubber Growers' Association, Inc.

Research Association

Samuel Thompstone Rowe became chairman of the board of management of the Research Association of British Rubber Manufacturers, succeeding R. W. Lunn, elected vice president after having been in office two years. Major O. W. H. Briggs and G. Lever have been reappointed vice chairmen; while H. Rogers succeeds E. C. Lacy as honorary treasurer, and Wm. Thomas Simpson has been appointed chairman of the Development Division Committee. At the recent annual meeting Sir Harold Hartley was reelected president, and the following nominated vice presidents: H. Berry, H. H. Burton, Lieut.-Col. J. Sealy Clarke, H. Evans, W. J. Gallagher, T. H. Hewlett, R. W. Lunn, Major J. H. Mandelberg, H. Eric Miller, J. A. Redfern, Mr. Rowe, F. H. Sprang, and Sir Herbert Wright.

The new chairman is president of the Institution of the Rubber Industry and chairman of the I.R.M.A. Born at Manchester in 1868, he has been associated with the industry for over 50 years, having joined the staff of Chas. Macintosh & Co., Ltd., (now Dunlop) in 1883.

Sir Harold Hartley, C.B.E., M.C., F.R.S., born in London, September, 1878, is vice president and director of scientific research of the London Midland & Scottish Railway.

Mr. Simpson has had varied experience in the industry. A native of Newcastle-on-Tyne, he joined the Irwell & Eastern Rubber Co., Ltd., in 1906; Canadian Rubber Co., Montreal, 1911; Miller Rubber Co., Akron, O., 1914; and Rubber Co. of Scotland, Ltd., 1919.

FINLAND

During 1937, Finland imported crude rubber, gutta percha, and balata totaling 3,177 tons. In addition she imported 884 tons of automobile tires, 172 cycle and motorcycle tires, 74 tons footwear, 217 tons packing, 45 tons belting, 30 tons hose, and 87 tons other rubber goods. Among the exports were 215 tons of rubber shoes.

GERMANY

Chemists' Meeting

The Deutsche Kautschuk Gesellschaft held its eleventh annual meeting in Hamburg from September 26 to 28. Various German and Netherlands scientists were scheduled to read papers, including: W. Kuhn, "Relation between Constitution and Elastic Condition of High Polymeric Combinations;" R. Houwink, "The Causes of High Elasticity;" W. Willstadt, "External Influence and Internal Condition of Rubber;" E. Rohde, "Comparison of the Hysteresis of Natural Rubber and Buna Mixes in the Low Elongation Zone;" H. Roelig, "Influence of External Dynamic Testing Conditions on Damping and Durability of Soft Rubber Vulcanizates;" B. Steinborn, "Rubber in Construction and as Springing Material;" T. Baader, "Control of Rubber Mixes;" A. Ruthing, "Determining Copper in Rubberized Fabrics;" E. Badum, "Permeability of Artificial Materials and of Rubber;" H. Hagen, "Plasticizing Buna;" P. Stöcklin, "Heat-Resistant Buna Mixes;" P. Nowak, "The Influence of Rubber-Like High Polymers on the Physical Properties of Buna Mixes;" C. Kraemer, "Emulsions Resembling Latex, Based on Non-Vulcanizable Polymerization Products."

Semperit Changes

The Semperit-Oesterreichisch Amerikanische Gummiwerke A.G., Vienna, has handed its interests in the Czechoslovakia and Polish auxiliaries over to the Rubber Investment A.G., recently formed in Zurich, Switzerland. The former of these two branches is the Matador Gummiwerke A.G., which after amalgamation with the Prager Gummifabrik Vysocani A.G., Prague, in 1932, operated with a capital of 10,000,000 Czech kronen. It produced tires, mechanical goods, heels, etc., at its works in Pressburg. The Polish branch is the Semperit Polish Rubber Works of Cracow, capitalized at 1,000,000 Zloty, and producing cycle tires and various kinds of rubber goods. The ownership of the Jugoslavian and Rumanian Semperit Companies remains unchanged.

Bata A.G. Ottmuth Reorganized

Far-reaching changes have taken place in the organization of the Bata A.G. Ottmuth. The majority of the shares, hitherto held by English and American banks, has now been acquired by Germans. Dr. J. A. Bata, formerly on the board of directors, has resigned, and the concern is to be known in future as the Ota Schlesische Schuhwerke Ottmuth A.G.

Buna Surgical Gloves

A German medical paper stated Buna surgical gloves have a life two to three times as long as the usual rubber gloves. They are said to be able to withstand being sterilized 15 to 20 times without any other change than that they become somewhat less soft. Small holes and cuts, it is added, can be easily repaired by means of Buna and a special adhesive.

Imports and Exports

Although imports of crude rubber eased off during the current year, as compared with the latter half of 1937, totals for the first half of 1938 increased over those for the corresponding period last year. The comparative figures were 484,756 against 452,666 quintals. Imports of waste fell from 146,470 to 21,237 quintals; to the latter figure should be added imports of 64,522 quintals of old tires and tubes.

Most exports declined from the 1937 figures, particularly bicycle tires and tubes, the former of which fell from 958,926 to 683,599 units, and the latter dropped from 1,286,837 to 628,707 units. Exports of automobile tires were only 92,211 units, against 144,658; and tubes, 63,452 against 68,247 units; rubber thread fell from 817 to 547 quintals; hose from 6,590 to 5,551 quintals; and belting exports declined from 1895 to 1863 quintals.

Chlorinated Rubber Solutions

The Chemische Fabrik Buckau, Ammendorf, patented a process to make chlorinated rubber solutions of varying viscosity and varying degrees of polymerization. To attain this the rubber solutions are exposed to the intense light of a mercury lamp or to direct sunlight not only during chlorination, but also—and this is important—for a longer or shorter period after chlorination is complete.

HUNGARY

Hungary recently began the development of a plastics industry. One large concern is said to be erecting extensive works for producing phenol from brown coal so as to be independent of foreign sources of phenol. Two other important concerns, besides several smaller companies, have equipped works for making plastics. The firm of Ludwig David is said to be planning to utilize naphtholine for artificial materials and also to produce "Thiokol."

NETHERLANDS

Rubber Road Composition

In a recent patent taken out by Herman Heinrich Schroder, of Rijswijk, Holland, calcareous marl is mixed with latex or concentrated latex at atmospheric temperature to obtain compact masses that can be spread, for road surfaces, flooring, etc., or molded. The marl utilized, of a special type found in South Limburg, Netherlands, for instance, does not contain foreign metals or metallic compounds in harmful amounts. The marl is reduced to a fine granulation that will pass through a sieve of at least 100 mesh per square centimeter; it has a volume weight of about 1.25 and contains from 90 to 97% calcium carbonate.

It is claimed that provided this marl has a sufficient moisture content, it has little or no effect on coagulation of the latex; it can therefore be quickly and thoroughly mixed with the latex, yielding a material that is easy to spread and can be compressed to a firm, but elastic product.

Rubber Powder

Another recent Netherlands patent pertains to powdered rubber. Various attempts have been made to eliminate or reduce to a minimum the tendency of crumb or powdered rubber to stick together, for instance dusting with zinc stearate. This method has the disadvantage of requiring the use of a large excess of the powder.

Wetting the rubber particles while they are still warm and dry and have not yet had a chance to adhere has also been proposed. Gebr. Stork & Co.'s Apparatenfabriek N.V., Amsterdam, found that if the water in the latter process is heated to about 65° C., the effect is considerably improved so that the crumbs of rubber, after being dried, hardly adhere, if at all. Where necessary, however, it is advised to work a small amount of zinc stearate (about ½ to 1%) through the powder as it comes from the sieve after having been treated with the warm water and before all the water has been removed. In this way the still moist crumbs receive a light coating of powder, and the excess amounts of zinc stearate required, when dry crumb is dusted with this powder, are avoided.

Resume of Local Rubber Industry

Since 1931 the Netherlands rubber manufacturing industry has steadily advanced, from ten plants to 17 in 1934, which have been maintained. These works employed 1,680 in 1931 and 2,730 in 1937; in the former year the output represented a value of 6,030,000 guilders, but dropped to 4,790,000 in 1932;

(Continued on page 62)

Rubber Industry in Far East

MALAYA

R.R.I. Plans

An extension service is planned by the Rubber Research Institute of Malaya, the director, H. J. Page, stated in the annual report of the institute for 1937. It will attempt to disseminate more widely the results of scientific research by presenting information to planters in a form that can be readily understood. To this end Mr. Page envisages (besides the publication of the institute's journal, its annual report, the technical planting manuals) the publication also of a monthly "Planters' News Letter" to contain articles on subjects of outstanding interest of the moment written in everyday language, and hence calculated to appeal to the generality of planters; also information taken from technical publications in other countries, particularly Netherland India, from advisory correspondence, etc. In addition it proposes issuing an annual review that will consist of a survey of all published technical information on rubber production which marks a real advance in useful knowledge. No such annual is at present available in English as far as rubber growing is concerned, or in any other language either, Mr. Page believes.

Besides the lectures which are already given from time to time there are also to be R.R.I. planters' conferences to be held probably twice a year at some big center when an important subject of current interest will be discussed from all angles—scientific, practical, and economic. While Mr. Page would like to initiate radio broadcasts to planters, he can do nothing useful in this direction until Malaya has a better broadcasting system.

Importance of Rubber

"Malayan Agricultural Statistics, 1937," by D. H. Grist, just issued by the Department of Agriculture, Straits Settlements and Federated Malay States, gives much information about agricultural conditions in Malaya, an examination of which cannot fail to leave a very clear impression of the importance of the rubber industry here. The total area under cultivation in all Malaya in 1937 was more than 5,000,000 acres, but of this 3,304,657 acres, or about 64%, was under rubber. The net exports of rubber at the end of 1937 came to 468,169 tons, value $341,183,-175 (Straits currency); the quantity of all other agricultural products exported was about 75%, and the value only about 12% as compared with rubber exports.

Importance of Federated Malay States

An analysis of the figures for total acreage, number, and size of rubber estates, budded areas, etc., shows that the Federated Malay States, the four states of Selangor, Perak, Negri Sembilan, and Pahang, occupy first place in the Malayan rubber industry. Their combined planted area amounted to 1,625,532 acres at the end of 1937, against 335,527 acres for the Straits Settlements, and 1,343,598 acres for the six states making up the Unfederated Malay States. The federated states have 1,321 estates of 100 acres and over, aggregating 1,033,426 acres, against 314 such estates with total area of 207,790 acres in the Straits Settlements and 865 estates with total area of 785,132 acres in the U.M.S.

The number of budded gardens in Malaya in 1937 totaled 677 with a combined area of 219,925 acres; of these, 445 areas covering 120,927 acres are in the F.M.S., as compared with 54, covering 4,634 acres in S.S. and 178 totaling 94,364 acres in the U.M.S.

The Place of Johore

If the individual states are considered, then judging by the figures, Johore, the principal state in the Unfederated Malay States, occupies first place in the Malayan rubber-growing industry. Out of the total planted acreage, 883,904 acres are in this single state; of the individual states, it has the largest number of small holdings, covering 360,759 acres, the greatest number of large estates held by Chinese, Indians, Japanese, and Malays, totaling 185,270 acres, and some of the biggest European estates, totaling 337,867 acres.

It has 116 areas of budded rubber covering 70,846 acres; of these, 17 gardens are 1,000 acres in extent or more and have a combined area of 48,912 acres; whereas the F.M.S., of a total of 445, has only 21 areas which are 1,000 acres or larger; but their combined acreage is 55,246 acres, thanks to the six areas totaling 26,083 acres in Negri Sembilan.

Development of Budgrafting

In the early years of budgrafting and up to 1927 Kedah, another of the Unfederated Malay States, showed the greatest activity in this field, but then planters apparently lost interest rapidly and did not add substantially to their budded areas until 1936. On the other hand Perak and Selangor of the F.M.S., where budding was started about the same time as in Kedah, have advanced steadily although at an initially slower rate.

Johore, which now has the largest budded area of any single state, had only 11 acres budded up to 1922 and did not add more than 22 acres to this in the next four years; but from 1927 onward, progress was rapid and did not slow down appreciably until 1933 and 1934, years in which budding declined considerably throughout Malaya. The peak years for both the F.M.S. and Johore as far as budding is concerned were from 1928 through 1932. In that period these districts budgrafted a total of 133,323 acres, of which 86,335 acres were in the F.M.S. and 46,988 in Johore.

Of the total Malayan budded area of 219,925 acres, 136,235 acres were tappable at the end of 1937, but only 94,907 acres were actually in tapping at the time.

INDIA

Imports Fall

Increased local production of rubber footwear and of all kinds of tires is cutting into imports more and more. In regard to footwear, it is Japan, which has been supplying practically all of the rubber-soled canvas shoes imported, which has suffered the severest setback in the last few years. In the fiscal year ended March, 1937, India still imported 1,135,679 pairs of rubber-soled canvas shoes, value 730,000 rupees; in the following fiscal year, this figure had fallen to 385,961 pairs, value 350,000 rupees; leather shoes with rubber soles dropped from 23,292 pairs, value 50,000 rupees, to 13,760 pairs, value 20,000 rupees; all-rubber footwear came to 97,804 pairs, value 60,000 rupees, against 110,182 pairs, value 60,000 rupees.

Imports of all kinds of tires and tubes declined as the result of greater production by the Dunlop factory near Calcutta. It appears that two brands of tires are produced which it is expected will supply 70 to 75% of the demand in India in the near future. While total imports of pneumatic automobile tires decreased from 290,367 to 257,019 covers, the heaviest decline was

noted in imports of cycle tires, which dropped from 1,816,876 to 980,165 covers; motor cycle tires numbered 1,897, against 2,947; and solid tires, 2,802, against 2,322. In all cases the reduction was at the expense of the United Kingdom; imports from the United States, on the other hand, rose considerably, to about double the value of the preceding year.

Incidentally, it is noted that imports of all kinds of motor vehicles, including motor cycles, underwent a marked increase in the period under review; this was also true for bicycles. The United Kingdom, United States, Canada, and Germany shared in this growth of business. It is complained, however, that German manufacturers are quoting prices on passenger cars and motor cycles which are remarkably low and with which it is almost impossible to compete.

Poorer Business in 1938

The trade recession in the United States, the uncertain international situation, and the conflict in China, are among the causes contributing to a decline in business in India in the first half of 1938. Tire sales in that period decreased about 16% as compared with the first half of 1937. At the same time the amount of crude rubber used by Burma and India dropped from 3,908 long tons in the first six months of 1937 to 2,952 long tons in the corresponding period of 1938.

NETHERLAND INDIA

Exports and Imports

The Central Bureau of Statistics gives final figures for exports of crude rubber from Netherland India for June, 1938, which totaled 24,851,627 kilos. Java and Madura shipped 4,591,619 kilos, including 10,836 kilos latex, in addition to 33,403 kilos in the form of tires. Estates in the Outer Provinces sent 8,307,082 kilos of rubber, including 425,210 kilos latex, while native rubber from the Outer Provinces came to 11,919,523 kilos.

The improvement in prices after the drastic quota cut to 45% encouraged tapping in Java, but more particularly in the Outer Provinces among native growers, as the preliminary figures for July, 1938, indicate. In that month the total exports from Netherland India were 35,651 metric tons, considerably more than had been shipped for some months. The increase was, as already noted, largely due to the heavy shipments of native rubber from the Outer Provinces, which totaled 21,483 tons. Exports of estate rubber from Java increased to 7,096 tons, but estates in the Outer Provinces sent only 7,072 tons.

At the end of July estate shipments for all Netherland India were 8,239 tons below quota, whereas native rubber now showed an excess of 169 tons.

The imports of automobile tires into Netherland India totaled 18,553 units in the first five months of 1938, against 24,544 units in the first half of 1937 and 28,993 units in the second half of that year. The decrease was due to reduced shipments from Japan and Great Britain.

Pneumatics for Animal-Drawn Carts

The Department of Traffic and Public Works has appointed a special committee to study the possibilities of equipping native animal-drawn vehicles with pneumatic tires.

Road tests are claimed to have shown that the costs of maintenance of asphalted roads specially assigned for iron-tired native drays are eight times as high as those of roads assigned for motor cars and trucks. Native dray owners would probably not be able to buy new equipment unaided, consequently the Volkscredietbank has offered to finance the change-over at 6% in five years with a guarantee of 20% by the Provincial or Municipal Board within whose territory the dray owners reside.

CEYLON

At a meeting of the State Council a bill was passed, after prolonged discussion, providing that in the allocation and distribution of rights for new planting, the main principle would be to serve peasants and middle-class Ceylonese first and later the other rubber producers. The International Rubber Regulation Scheme permits Ceylon to plant an additional 30,000 acres of rubber before 1940.

Ceylon's rubber exports for the first half of 1938 totaled 53,092,136 pounds, against 68,764,388 pounds.

Imports of manufactured goods included 14,550 pneumatic tires for automobiles, as compared with 14,452 in the 1937 period. Most of the tires were supplied by the United Kingdom. British India sent 472 tires against none the year before.

NETHERLANDS

(*Continued from page* 60)

the following year occurred an improvement which has continued to grow until the value of the output in 1937 reached 9,500,000 guilders. The chief products are tires and tubes for bicycles, and in 1931 these numbered 2,690,000 and 1,698,000 respectively; in 1937 the output of tires was 4,000,000 and of tubes, 2,500,000. The last figure represents a slight decrease from the figure for 1936. Crude rubber consumption by the Netherlands factories mounted without a break from 1,509 metric tons in 1931 to 3,080 metric tons in 1937, and reclaim, from 74 to 306 metric tons in 1936. (Reclaim figures for 1937 are not available.)

RUMANIA

There has been a notable increase in production by Rumania's five rubber footwear factories. The largest of these factories, which together produce about 1,000,000 pairs of rubbers and galoshes, is the Caurom; then follows Cauciucul Quadrat, which is said lately to have doubled its capital and expanded production, thanks to the support of a Netherlands firm; the Uzinele Chimica, the Palma, and Kraterit. Imports of rubber footwear, which had been 43,300,000 lei in 1935, fell considerably in 1937 to about 5,000,000 lei.

The Rumanian government is said to be most interested in the rapid development of a local tire industry. Up to the present automobile tires have had to be imported; more than half of the total is supplied by America and England. In 1937 the total tire imports came to 899 tons, value 83,900,000 lei. A commencement has been made to manufacture tires locally; late in 1937 the Fabrica de Cauciu equipped a section for the production of tires, and small amounts are claimed to have appeared on the market already. However hopes are centered on the important Banloc concern, founded in 1937 with a capital of 20,000,000 lei, which it is expected will be producing by the Fall of 1939, when it is hoped that most of the local requirements will be covered.

In line with greater production imports of crude and reclaimed rubber have been increasing; while total imports of these materials came to 876 tons in 1935, they increased to 1,273 tons in 1936 and again to 1,835 tons last year.

BELGIUM

Caoutchoucs et Plastiques, a new quarterly publication, is the organ of the Association Belge des Techniciens du Caoutchouc et Autres Matieres Plastiques. In an editorial the honorary president of the association, Paul Erculisse, explains that the chief aim of the periodical is to report the association's activities and to publish communications made at its sessions. Abstracts of foreign publications also will be presented.

The above association, formed in the latter part of 1931, now has 38 members. The officers include: honorary president, Mr. Erculisse, of the University of Brussels and Scientific Direc-

(*Continued on page* 76)

Patents and Trade Marks

MACHINERY

United States

2,127,413. **Coating Apparatus.** C. W. Leguillon, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,127,791. **Latex Purifier.** H. P. Stevens and J. W. W. Dyer, both of London Bridge, assignors, by mesne assignments, to The British Rubber Producers' Research Association, London, both in England.
2,128,827. **Apparatus to Manufacture Thin Rubber Articles.** F. L. Killian, deceased; by F. B. Killian, executor, Doylestown; said F. L. Killian, assignor, by mesne assignments, to F. B. Killian, trustee, Akron, both in O.

Dominion of Canada

376,186. **Tire Form.** Akron Standard Mold Co., assignee of H. C. Bostwick, both of Akron, O., U. S. A.
376,235. **Pouch Making Form.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of H. deB. Rice, Barrington, R. I., U. S. A.
376,235. **Pouch Making Form.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of G. G. Wanless, Montreal, P. Q.
376,327. **Ball Winder.** H. N. Huse, Providence, R. I., U. S. A.

United Kingdom

483,927. **Tire Formers.** D. Bridge & Co., Ltd., (National Rubber Machinery Co.).
483,976. **Pouch Mold.** R. F. McKay, (International Latex Processes, Ltd.).
484,643. **Tire Tread Slitter.** Consolidated Rubber Manufacturers, Ltd.
484,711. **Yarn Feed Device.** Soc. Etablissements Lebocey.
484,825. **Vulcanizing Pad.** A. Hoving.
484,837. **Vulcanizing Mold.** Firestone Tyre & Rubber Co., Ltd., (Firestone Tire & Rubber Co.).
485,242. **Vulcanizing Apparatus Tension Band.** Boston Woven Hose & Rubber Co.
485,401. **Tire Mold.** Dunlop Rubber Co., Ltd., and F. G. Broadbent.
485,541 and 485,542. **Machine for Kneading Rubber.** W. Geipel, Ltd., K. S. and S. Geipel, (representatives of W. Guy-Pell).
485,705. **Shoulder Pad Mold.** F. Chassaing.
486,125. **Tire Retreader.** Fit, Ltd., and J. J. Hill.
486,132. **Apparatus to Manufacture Stethoscope Rubber Tubing.** C. E. Green, and C. D. Reyersbach.
486,197. **Coating Machine.** W. J. H. Hinrichs.
486,376. **Shoe Vulcanizer.** Bata Akciova Spolecnost.
486,620. **Tools for Producing Printing Plates.** Naamlooze Vennootschap Wallramit Handel Maatschappij.
486,718. **Cutter.** Kolnische Gummifadenfabrik Vorm. F. Kohlstadt & Co.

PROCESS

United States

2,126,723. **Glove.** V. H. Bodle, Newton, assignor to Hood Rubber Co., Inc., Watertown, both in Mass.
2,126,733. **Rubber Transmission Bands.** H. W. Catt, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,126,818. **Gas-Retaining Fabric.** T. P. Sager and D. F. Houston, both of Washington, D. C.
2,126,831. **Treating Latex.** D. Spence, Monterey, Calif.
2,127,070. **Rubber Thread.** U. Pestalozza, assignor to Societa Italiana Pirelli, both of Milan, Italy.
2,127,228. **Rewoven Carpet.** C. R. McGimsey, Rowayton, Conn.
2,127,487. **Balls.** W. J. Voit, Los Angeles, Calif.
2,127,548. **Treating Containers.** J. F. Boyle, Teaneck, and E. F. Glover, West New York, both in N. J.
2,127,560. **Rubber Compounding.** G. S. Haslam, Palmerton, Pa., assignor to New Jersey Zinc Co., New York, N. Y.
2,128,229. **Treating Cellulosic Materials.** W. H. Charch, Buffalo, N. Y., and D. B. Maney, Old Hickory, Tenn., assignors, by mesne assignments, to E. I. du Pont de Nemours & Co., Wilmington, Del.
2,128,312. **Rubber Coated Fabrics.** E. A. Murphy, Birmingham, assignor to Dunlop Rubber Co., Ltd., London, both in England.
2,128,654. **Vulcanized Rubber Solutions.** N. Lebedenko, M. Naphtali, N. Kroll, and H. Meyer, all of Berlin, Germany, assignors to Commercial Ingredients Corp., New York, N. Y.

Dominion of Canada

375,669. **Elastic Fiber.** Standard Oil Development Co., Linden, assignee of P. J. Wiezevich, whose name has been changed to P. J. Gaylor, Elizabeth, both in N. J., U. S. A.
375,800. **Rubber Goods.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of E. A. Murphy and G. W. Trobridge, co-inventors, both of Birmingham, England.
376,105. **Gas Expanded Latex.** Rubatex Products, Inc., assignee of D. Roberts, both of New York, N. Y.
376,216. **Container Seal.** Dewey & Almy Chemical Co. of Canada, Ltd., Farnham, P. Q., assignee of D. L. Shanklin and W. C. Ross, co-inventors, both of Winchester, Mass., U. S. A.
376,217. **Activated Carbon.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of F. N. Pickett, London, England.
376,236. **Porous Rubber Product.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of J. R. Gammeter, Akron, O., U. S. A.
376,279. **Tire.** Wingfoot Corp., Wilmington, Del., assignee of W. H. Nicol, Cuyahoga Falls, O., U. S. A.
376,292. **Toilet Article.** A. E. Serewicz, inventor, and W. P. Wrisley, assignee of one-half of the interest, both of Chicago, Ill., U. S. A.
376,432. **Artificial Leather.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of M. Faldini, Milan, Italy.

United Kingdom

484,659. **Purifying Rubber.** W. W. Triggs, (Wingfoot Corp.).
484,776. **Rubber Thread.** International Latex Processes, Ltd.
484,792. **Coating Pile Fabric.** A. J. Stephens, (Collins & Aikman Corp.).
484,798. **Molding Sponge Rubber.** J. A. Talalay.
484,929. **Perforating Rubber.** F. C. Jones and E. Lumsden.
484,990. **Coating Paper Cartons.** G. Lacour.
485,147. **Elastic Thread.** International Latex Processes, Ltd.
485,149. **Cables.** Felten & Guilleaume Carlswerk A.G.
485,321. **Rubber Composition.** International Latex Processes, Ltd., A. S. Carpenter, and D. F. Twiss.
485,607. **Spray Coating Surfaces.** F. F. Schwartz and M. A. Chavannes.
486,060. **Springs.** C. Lorenz A.G.
486,098. **Rubber Threads.** W. Diederich.
486,124. **Extruding Rubber.** Rubber Producers Research Association, P. Schidrowitz, and C. A. Redfarn.
486,154. **Pouches.** H. Birkbecks, (Canada Foils, Ltd.).
486,641. **Metal Foil.** R. F. McKay, (International Latex Processes, Ltd.).
486,926. **Treating Textiles.** Tootal Broadhurst Lee Co., Ltd., A. E. Battye, J. Tankard, and F. C. Wood.

Germany

663,684. **Rubber Threads or Bands.** Kolnische Gummifaden-Fabrik vorm. Ferd. Kohlstadt & Co., Kohln-Deutz.
664,060. **Sponge Rubber.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands. Represented by R. and M. M. Wirth, and C. Weihe, all of Frankfurt a.M., and T. R. Koehnhorn, Berlin.

CHEMICAL

United States

2,127,400. **Plasticizers.** C. F. Gibbs, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,128,127. **Compounding Material.** A. K. Epstein and B. R. Harris, both of Chicago, Ill., assignors to Colgate-Palmolive-Peet Co., Jersey City, N. J.
2,128,136. **Chlorinated Rubber Coating.** W. E. Gloor, Parlin, N. J., assignor to Hercules Powder Co., Wilmington, Del.

Dominion of Canada

375,628. **Rubber-Like Products.** I. G. Farbenindustrie A.G., Frankfurt a.M., assignee of W. Starck and W. Heuer, co-inventors, both of Hofheim, both in Germany.
375,806. **Rubber Hydrochloride Compositions.** Marbon Corp., assignee of H. A. Winkelmann, both of Chicago, Ill., U. S. A.
375,975. **Rubber Preservatives.** Monsanto Chemical Co., St. Louis, Mo., assignee of R. L. Sibley, Nitro, W. Va.
376,184. **Accelerator.** Wingfoot Corp., Wilmington, Del., assignee of H. I. Cramer, Cuyahoga Falls, O., both in the U. S. A.
376,218. **Hydroxy Amino Compound.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of H. H. Bassford, Jr., Naugatuck, Conn., U. S. A.
376,219. **Accelerator.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of A. J. Laliberté, Naugatuck, Conn., U. S. A.
376,220. **Antioxidant.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of W. F. Tuley, Naugatuck, Conn., U. S. A.
376,221. **Vulcanizing Agent.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of W. E. Messer, Cheshire, Conn., U. S. A.
376,278. **Mercaptothiazole.** Wingfoot Corp., Wilmington, Del., assignee of C. H. Smith, Tallmadge, and C. W. Gay, Akron, both in O., all in the U. S. A.
376,440. **Accelerator.** Les Usines de Melle, formerly Usines de Melle, Melle, assignee of H. M. Guinot, Niort, both in France.

United Kingdom

483,786. **Rubber-Charcoal Composition.** United States Rubber Products, Inc.
484,225. **Plasticized Hydrohalogenated Rubber.** W. J. Tennant, (Marbon Corp.).
484,788. **Material to Fill Hollow Insulators.** British Thomson-Houston Co., Ltd.
484,828. **Fillers for Hard Rubber Compounds.** B. D. Porritt, J. R. Scott, and A. L. Hock.
484,932. **Rubber-Neoprene Ebonite.** J. Morgan.
485,198. **Crease Resisting Materials.** D. Finlayson and R. G. Perry.
485,199. **Crease Resisting Materials.** H. Dreyfus, D. Finlayson, and R. G. Perry.
485,204. **Latex-Cement Compositions.** S. H. Colton, and A. G. Rodwell.
485,234. **Hydrohalogenated Rubber.** Reynolds Research Corp.
485,372. **Crease Resisting Materials.** H. Dreyfus, D. Finlayson, and R. G. Perry.
485,554. **Rubber-Like Materials.** Kabushiki-Kaisha Sumitomo Densen Seizosho.
485,757. **Rubber Colors.** I. G. Farbenindustrie A.G. and W. W. Groves.
485,941. **Rubber-Like Polymers.** B. J. Habgood, R. Hill, L. B. Morgan, and Imperial Chemical Industries, Ltd.
486,109. **Accelerators.** Wingfoot Corp.
486,162. **Sealing Composition.** F. E. Stupnicki.
486,712. **Calcium-Rubber Preparations.** L. Hamburger.
487,287. **Abrasive Wheel Compositions.** Norton Grinding Wheel Co., Ltd.
487,323. **Rubber-Like Condensation Products.** W. W. Groves, (I. G. Farbenindustrie A.G.).
487,604. **Vinyl Polymerization Products.** A. Carpmael, (I. G. Farbenindustrie A.G.).

GENERAL

United States

2,126,703 and 2,126,704. **Resilient Connection.** F. Schmidt, Harburg-Wilhelmsburg, Germany, assignor to Metalastik, Ltd., Leicester, England.
2,126,705. **Coupling.** F. Schmidt, Harburg,Wilhelmsburg, Germany, assignor to Metalastik, Ltd., Leicester, England.
2,126,706. **Pipe Connection.** F. Schmidt, Harburg-Wilhelmsburg, Germany, assignor to Metalastik, Ltd., Leicester, England.
2,126,707. **Rubber and Metal Spring.** F. Schmidt, Harburg-Wilhelmsburg, Germany, assignor to Metalastik, Ltd., Leicester, England.
2,126,708. **Rubber Spring.** F. Schmidt, Harburg-Wilhelmsburg, Germany, assignor to Metalastik, Ltd., Leicester, England.
2,126,716. **Gasket.** G. T. Balfe, assignor to Detroit Gasket & Mfg. Co., both of Detroit, Mich.
2,126,766. **Flower Holder.** F. J. Gerbermann, St. Louis, Mo.
2,126,769. **Cassette.** W. Goldschmidt, Erlangen, assignor to Siemens-Reiniger-Werke A.G., Berlin, both in Germany.
2,126,770. **Inflating Device.** T. A. Hammond, Montclair, N. J.
2,126,771. **Covering for Uncured Rubber Patches.** H. H. Hanson, assignor to Shaler Co., both of Waupun, Wis.
2,126,777. **Tattoo Marker.** G. A. Holt, Chicago, Ill., assignor to Prairie Farm Service Co., a corporation of Ill.
2,126,837. **Elastic Wall Member.** G. H. Stewart, Akron, and B. A. Evans, Cuyahoga Falls, both in O., assignors to B. F. Goodrich Co., New York, N. Y.
2,126,845. **Tire Valve.** J. Wahl, Rosedale, N. Y., assignor to Scovill Mfg. Co., Waterbury, Conn.
2,126,904. **Resilient Horseshoe Pad.** F. J. Marsh, Christchurch, New Zealand.
2,126,905. **Undergarment.** M. E. McCracken, Evanston, Ill.
2,126,948. **Paving Unit.** H. Dewhirst, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,126,961. **Traction Device.** R. Hodgkinson, Worcester, Mass.
2,126,965. **Paving Slab.** C. W. Leguillon, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,127,052. **Tire.** E. Von Bon Horst, San Clemente, Calif.
2,127,075. **Tire.** G. Venosta, assignor to Societa Italiana Pirelli, both of Milan, Italy.
2,127,094. **Vaginal Instrument.** O. A. Strauss, Milwaukee, Wis.
2,127,122. **Cable.** W. F. Lamela, E. Paterson, assignor to Okonite Co., Passaic, both in N. J.
2,127,123. **Cushioning Device.** S. T. Liem, The Hague, Netherlands.
2,127,136. **Inhaler Guard.** A. I. Pobirs, Providence, R. I.
2,127,151. **Sealed Joint.** J. G. Aldinger, assignor to York Ice Machinery Corp., both of York, Pa.
2,127,187. **Tire Deflation Signal.** M. Riusech, Habana, Cuba.
2,127,219. **Spring.** C. F. Hirshfeld, Detroit, Mich., assignor, by mesne assignments, to Transit Research Corp., New York, N. Y.
2,127,242. **Horse Collar Pad.** A. Wesley, Chicago, Ill., assignor, by mesne assignments, to American Pad & Textile Co., Greenfield, O.
2,127,385. **Fountain Pen.** H. Baron, San Salvador, El Salvador.
2,127,397. **Strainer.** A. L. Freedlander, assignor to Dayton Rubber Mfg. Co., both of Dayton, O.
2,127,532. **Antiskid Device.** A. F. Roth, Wilkes-Barre, Pa.
2,127,533 and 2,127,534. **Molds and Cores.** C. M. Saeger, Jr., Bowmanstown, Pa.
2,127,535. **Core Binder.** C. M. Saeger, Jr., Bowmanstown, Pa.
2,127,538. **Signaling Device.** H. W. Seiger, Los Angeles, Calif.
2,127,544. **Waterproof Rubber Covering for Cord Connectors.** C. T. Von Holtz, assignor to H. Hubbell, Inc., both of Bridgeport, Conn.
2,127,627. **Repair Clamp.** J. F. Goddard, Canfield, O.
2,127,710. **Furniture.** R. B. Baker, Mount Prospect, Ill.
2,127,780. **Hosiery.** J. L. Marshall, assignor to United Hosiery Mills Corp., both of Chattanooga, Tenn.
2,127,783. **Shoe Stiffener.** C. E. Reynolds, Watertown, assignor to Cambridge Rubber Co., Cambridge, Mass.
2,127,834. **Colostomy Pouch Apparatus.** I. F. Spindell, Lynn, Mass.
2,127,871. **Apparatus to Stop Leaks in Ships.** V. R. Kozloff, Los Angeles, Calif.
2,127,872. **Vacuum Massaging Apparatus.** N. Kutz, Cologne, Germany.
2,127,911. **Self-Closing Tube and Cap.** H. W. and R. G. Goss, both of Toronto, Ont., Canada.
2,127,942. **Coupling.** F. Schmidt, Harburg-Wilhelmsburg, Germany, assignor to Metalastik, Ltd., Leicester, England.
2,127,946. **Applicator.** G. E. Troeller, St. Albans, assignor to Durex Products, Inc., New York, both in N. Y.
2,127,979. **Resilient Mounting.** H. J. Loftis, assignor to Henrite Products Corp., both of Ironton, O.
2,128,049. **Tee.** S. J. Karkoska, Cleveland, O.
2,128,052. **Fountain Pen.** C. J. MacNally, Jamaica, N. Y.
2,128,069. **Steering Wheel.** F. C. Ashby, assignor to F. Ashby & Sons, Ltd., both of Birmingham, England.
2,128,112. **Connecter.** W. H. Barlow, Middlebury, assignor to Scovill Mfg. Co., Waterbury, both in Conn.
2,128,204. **Overshoe.** E. W. Dunbar, Hudson, assignor to Cambridge Rubber Co., Cambridge, both in Mass.
2,128,216. **Yieldable Mount Means.** A. P. Armington, Willoughby, assignor to Euclid Road Machinery Co., Euclid, both in O.
2,128,217. **Plunger.** O. Anderson, Woodstock, Ill.
2,128,287. Comb. R. W. Davis, Natick, Mass.
2,128,296. **Coated Paper.** V. B. Goodwin and W. H. Pashley, both of New York, N. Y.
2,128,322. **Tire Rim.** A. D. Riehl, Loomis, Calif.

2,128,423. **Life Preserver.** F. G. Manson, Dayton, O.
2,128,456. **Fountain Pen.** W. A. Dusenbury, Sr., Highland Park, Mich.
2,128,568. **Foundation Garment.** H. Wipperman, assignor to H. W. Gossard Co., both of Chicago, Ill.
2,128,577. **Auto Hood Spacer.** W. B. Bauer, Springfield, O.
2,128,610. **Ball Throwing Device.** R. Heimers, Mexico, D. F., Mexico.
2,128,623. **Valve.** W. P. Stuck, Mt. Ayr, Iowa.
2,128,628 and 2,128,629. **Balloon.** I. Worobjoff, assignor of one-half to K. Franke, both of Berlin, Germany.
2,128,634. **Umbrella.** L. A. Capaldo, New York, N. Y.
2,128,635. **Laminated Structure.** W. H. Church, Buffalo, N. Y., and D. B. Maney, Old Hickory, Tenn., assignors, by mesne assignments, to E. I. du Pont de Nemours & Co., Wilmington, Del.
2,128,670. **Hemorrhoidal and Rectal Support.** W. Bolder, Mt. Dennis, assignor to R. R. Spicer, Toronto, Can.
2,128,733. **Resilient Support.** E. F. Riesing, assignor to Firestone Tire & Rubber Co., both of Akron, O.
2,128,764. **Elastic Fabric.** H. A. and M. E. Smith, both of Fairfield, Conn.
2,128,814. **Hose.** D. B. Gish, West Springfield, Mass.
2,128,876. **Undergarment.** J. A. Boysen, Rutherford, N. J., assignor to R. Reis & Co., New York, N. Y.

Dominion of Canada

375,688. **Overshoe.** Woodstock Rubber Co., Ltd., assignee of L. Koenig, both of Woodstock, Ont.
375,847. **Frost Shield.** Durkee-Atwood Co., assignee of A. W. Kile, both of Minneapolis, Minn., U. S. A.
375,848. **Mounting Apparatus for Printing.** J. S. Wheelwright, Tonbridge, co-inventor with and assignee of G. H. Abell, Esher, England.
375,913. **Fluid Pressure Mechanism.** Bendix-Westinghouse Automotive Air Brake Co., Pittsburgh, Pa., assignee of R. S. Sanford, New York, N. Y., and W. J. Andres, Pittsburgh, Pa., co-inventors, both in U. S. A.
375,959. **Belting.** Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., assignee of S. A. Brazier, Wilmslow, and J. Partington, Prestwich, co-inventors, both in England.
376,050. **Trap.** Animal Trap Co. of America, assignee of J. D. Zahm, both of Lititz, Pa., U. S. A.
376,073. **Tape.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of H. M. Kuhn, Clifton, N. J., U. S. A.
376,074. **Insulated Conductor.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of W. A. Gibbons, Montclair, N. J., U. S. A.
376,131. **Joint Covering.** A. C. Benedict, Rockville Centre, N. Y., U. S. A.
376,257. **Glove.** Surety Rubber Co., assignee of S. S. and J. B. Hall, coventors, Carrollton, O., U. S. A.
376,272. **Antiskid Device.** United States Rubber Products, Inc., New York, N. Y., assignee of E. Eger, Grosse Pointe Park, Mich., U. S. A.
376,339. **Medicine Dropper and Swab.** A. E. Massman, Lufkin, Tex., U. S. A.
376,343. **Meter Diaphragm.** G. Mills, Gordon, N. S. W., Australia.
376,485. **Riveting Apparatus.** E. Becker, Dessau, Germany.

United Kingdom

483,126. **Wheels.** Wingfoot Corp.
483,506. **Spring Suspensions.** Monroe Auto Equipment Co.
483,530. **Rubber Springs.** Getefo Ges. Fur Technischen Fortschritt.
483,687. **Spring Suspensions.** Auto Union A.G.
483,800. **Mixing Apparatus.** American Machine & Foundry Co.
483,815. **Separating Solid Materials.** J. Hedley, and P. M. Nash.
483,854. **Preventing Formation of Ice on Airplanes.** Dunlop Rubber Co., Ltd., and E. F. Field.
483,876. **Air Moistener.** W. Feldermann.
483,923. **Bung Hole Closure.** F. J. T. Barnes.
484,002. **Machine to Grind Valves.** C. W. Brown and V. B. North.
484,047. **Dental Material.** J. C. A. Fenger.
484,083. **Reservoir Brushes.** S. Orentreich.
484,141. **Veneers.** E. F. Von Ende.
484,165. **Grinding Wheel.** Norton Grinding Wheel Co., Ltd.
484,176. **Wheel Tires.** Schleudernie Ges.
484,188. **Platen Rollers.** J. Q. Sherman and Standard Register Co.
484,217. **Phial.** H. P. Baerends.
484,295. **Shock Absorber.** M. Goldschmidt.
484,307. **Gramophone.** E. R. Mountstephen, W. J. Wood, and A. G. Spence.
484,335. **Shuttle.** R. Balfour.
484,344. **Machine to Finish Hat Bodies.** Doran Bros., Inc.
484,363. **Trusses.** P. Madeuf.
484,446. **Bath Handle.** S. Dixon & Son, Ltd., and A. L. Girdler.
484,460. **Resilient Mounting.** Metalastik, Ltd.
484,471. **Cleaning Apparatus.** C. H. Vidal.
484,479. **Pump.** C. Bell-Walker.
484,481. **Elastic Suspension.** M. Goldschmidt.
484,485. **Machine for Decorticating and Softening Flax.** E. V. Hayes-Gratze.
484,498. **Spring Suspension.** W. A. Clements.
484,513. **Hopper Delivery Mechanism.** J. Watson and H. T. Lamb.
484,534. **Optical Projection Conveyers.** W. Altmann.
484,541. **Cable Joints.** A. Gotzl, (trading as Garvenswerke, Maschinen-, Pumpen- Und Waagenfabrik W. Garvens).
484,563. **Bottle Caps.** F. W. Schiller.
484,576. **Permeable Materials.** National Processes, Ltd., and W. J. Carter.
484,618. **Valve Box.** M-O Valve Co., Ltd., and J. F. Turner.
484,712. **Rubber Cement.** Rubber Producers Research Association, W. G. Wren, G. Martin, A. T. Faircloth, and W. S. Davey.
484,738. **Carpet Sweeper Guard.** Entwisle & Kenyon, Ltd., and J. P. Redfearn.
484,739. **Bunch Ball Exerciser.** F. J. Shillcock.
484,780. **Device to Protect Trees from Insects.** P. Eschert, and P. Kirchhoff.
484,813. **Condensers.** British Insulated Cables, Ltd., and H. Higham.
484,817. **Sound Absorbing Covering.** J. McLaren.
484,834. **Coupling.** Silentbloc, Ltd., and V. A. Trier.
484,877. **Joint.** L. Thiry.
484,889. **Hose.** G. Carpenter and Electric Hose & Rubber Co., Ltd.
484,890. **Wheel.** Metalastik, Ltd.
484,893. **Frame Buffer.** Auto Union A.G.
484,926. **Door.** R. A. Straw and C. G. Noble.
484,951. **Clutch.** Guy & Murton, Inc.
484,961. **Conveyer Trough.** Deutsche Eisenwerke A.G.
484,989. **Swimming Support.** W. Barcroft.
485,019. **Cabinets.** G. E. Osmond.
485,051. **Resisting Fluid Pressure Cover.** E. Fritsch.
485,060. **Vehicle Suspension.** J. Kolbe.
485,077. **Vehicle Suspension.** E. Schreiber.
485,086. **Ball.** Dunlop Rubber Co., Ltd., and S. G. Ball.
485,102. **Variable-Pitch Screw Propeller.** A. F. Evans and R. G. Wells.
485,112. **Bricklaying Device.** T. Gordon.
485,154. **Hose Coupling.** G. Carpenter Electric Hose & Rubber Co., Ltd.
485,185. **Brush Bristles.** S. and A. Steinmetz, and J. Baumann.
485,192. **Packing Ring.** D. Evans.
485,246. **Artificial Leg Strap.** S. Sokal, (Instituto Ortopedico Rizzoli).
485,249. **Foundation Garments.** H. A. and M. E. Smith.
485,250. **Corset.** H. A. Smith.
485,253. **Fabric Web Stretcher.** Vereinigte Farbereien & Appretur A.G.
485,257. **Vibration Damper.** Metalastik, Ltd.
485,270. **Motor Casings.** M. and M. Surjaninoff.
485,286. **Belts.** A. L. Freedlander.
485,291. **Joint.** C. W. Parris.
485,306. **Aerial Mine.** H. J. Muir.
485,313. **Arch Support.** D. N. Balter and H. Baines.
485,334. **Non-Skid Tread.** Fisk Rubber Corp.
485,339. **Shock Absorber.** Briggs Mfg. Co.
485,350. **Speedometer.** I.S.S.A.-Industria Specializzata Strumenti Aeronavigazione and U. Ciamberini.
485,400. **Cable.** Siemens & Halske A.G.
485,404. **Toy.** L. Marx & Co., Ltd.
485,405. **Rivet.** E. Heinkel.
485,422. **Machine to Open Envelopes.** A. M. Coleman, C. C. Bater, and G. A. Lee.
485,429. **Piston Rod Packing.** Soc. D'Inventions Aeronautiques Et Mecaniques S.I.A.M.
485,433. **Shoe.** H. Schroder.
485,444. **Cooking Vessel Lid.** E. Gimmi.
485,462. **Clip for Fastening Pipes, Etc.** O. Dehne and X. Vorbruggen.
485,497. **Hydraulic Apparatus.** Dunlop Rubber Co., Ltd., G. E. Beharrell, J. Wright, and H. Trevaskis.
485,527. **Eyelash Curler.** Cutvbuty, Ltd., and H. A. and P. J. A. Squire.
485,545. **Racquet.** A. Keller.
485,588. **Compound Sheet Materials.** F. Pfohl.
485,605. **Spring Fork for Motorcycle.** Phanomen-Werke G. Hiller A.G.
485,631. **Heel-Bar.** A. Duff.
485,727. **Vibrating Apparatus.** Procedes Techniques De Construction.
485,743. **Stitch Holder.** W. Hard, and Critchley Bros., Ltd.
485,749. **Bushes for Bung Holes.** F. J. T. Barnes.

485,769. **Seats.** J. R. Churchill.
485,809. **Sanitary Closet.** J. Bolding & Sons, Ltd., and W. J. Farrant.
485,826. **Pulse Movement Indicator.** British Thomson-Houston Co., Ltd.
485,828. **Horseshoe.** M. Mucklich.
485,880. **Bottle Closures.** S. C. Lomax, Ltd., S. C. Lomax, and H. Knightson.
485,899. **Gun.** E. Thorsell.
485,902. **Drilling Machine.** Soc. Alsacienne De Constructions Mecaniques.
485,912. **Shock Absorber Packing.** Vereinigte Deutsche Metallwerke A.G., and F. Faudi.
485,913. **Rubberized Felt.** Etablissements Iwan Voos.
485,918. **Brassiere.** S. Goddyn.
485,932. **Motor Supports.** Electrolux, Ltd.
485,940. **Curb.** G. E. Mitchell.
485,942. **Foundation Garment.** Charis Corp.
485,943. **Metal Sheets.** Fire-Proof Steel Co., Ltd., and C. F. Langworthy.
485,952. **Powder Puff.** M. A. Hassid.
485,963. **Resilient Mounting.** Getefo Ges. Fur Technischen Fortschritt.
486,058. **Draught Excluder.** F. Barme.
486,059. **Cables.** Okonite-Callender Cable Co., Inc.
486,061. **Cable Joints.** Okonite-Callender Cable Co., Inc.
486,136. **Joint.** Hardy, Spicer & Co., Ltd., and W. E. Sparrow.
486,147. **Tire.** Soc. Italiana Pirelli and G. Venosta.
486,177. **Wheel.** F. G. Brettell, (Steel Wheel Corp.).
486,212. **Generating Mechanical Oscillations.** L. Steinhaus.
486,215. **Elastic Compound Fabrics.** E. J. Hooper.
486,241. **Securing Panels to Walls and Other Supports.** Avri Products, Ltd., and F. A. Clarke.
486,270. **Vehicle Body Supension.** C. A. Voigt.
486,283. **Vehicle Opening Top.** Fiat Soc. Anon.
486,296. **Tube.** Superflexit, Ltd., and W. H. Grint.
486,333. **Resilient Mounting.** English Electric Co., Ltd., and E. A. Binney.
486,346. **Reflectors.** Harris & Sheldon, Ltd., and T. E. Sellers.
486,363. **Footwear Counter Stiffeners.** A. C. Sewall.
486,401. **Driving Belt.** E. Siegling.
486,413. **Vehicle Bodies.** J. H. Labourdette.
486,427. **Securing Cushions to Supports.** Getefo Ges. Fur Technischen Fortschritt.
486,431. **Hose Pipe.** W. F. J. Ruckley.
486,464. **Spindle Bearing.** Manufacture Alsacienne De Broches Anciennement Les Fils d'E. Latscha Soc. A.R.L.
486,466. **Ticket Books.** G. and E. Norbury, (trading as Challenge Electrical Specialties).
486,475. **Elastic Fabric.** R. and N. H. Symington & Co., Ltd., and G. W. Billing.
486,485. **Footwear.** Hungarian Rubber Goods Factory, Ltd.
486,489. **Waterproof Garment.** J. M. Edwards, and D. P. Lambe.
486,509. **Cable.** Okonite.
486,513. **Spring Mountings.** H. Melder, (trading as Muckemelderwerke).
486,588. **Road Breaking Machine.** W. R. Pettit.
486,646. **Screw Propeller.** H. Sukohl.
486,647. **Hosiery.** G. H. Piper.
486,658. **Joints.** M. Goldschmidt.
486,694. **Hydraulic Transmission of Power.** Dunlop Rubber Co., Ltd., G. E. Beharrell, J. Wright, and H. Trevaskis.
486,710. **Braces.** C. W. Barker.
486,773 and 486,774. **Hydraulic Apparatus.** Dunlop Rubber Co., Ltd., J. Wright, and H. Trevaskis.
486,776. **Compound Sheet Material.** Morton Sundour Fabrics, Ltd., and R. D. Simpson.
486,803. **Couplings.** Renold & Coventry Chain Co., Ltd., and J. K. Byrom.
486,837. **Vehicle Spring Suspension.** M. Goldschmidt (J. W. Leighton).
486,912. **Hair Curler.** R. Kelso and J. Coggans.
486,917. **Joints.** M. Goldschmidt.
486,919. **Screw Propeller.** B. Jablonsky.
486,937. **Switch.** P. S. Bear and H. E. Bucklen.
486,950. **Draught Excluder.** E. Peremi and L. Toth.
487,016. **Arch Support.** O. Thiel and M. S. Kleczewer.
487,083. **Bowling Mat.** H. Powell.
487,095. **Vehicle Spring Device.** Getefo Ges. Fur Technischen Fortschritt.
487,096. **Screw Propeller.** Bristol Aeroplane Co., Ltd., A. H. R. Fedden, and E. R. Gadd.
487,179. **Wheel.** F. W. Baker and W. E. Barclay.
487,269. **Tank Vehicle.** Thompson Bros. (Bilston), Ltd., H. J. Thompson, and J. W. Meredith.
487,346. **Resilient Support.** M. Goldschmidt.
487,407. **Resilient Mounting.** M. Goldschmidt.
487,463. **Joint Making Packing.** R. Bosch A.G.
487,578. **Cable.** Soc. Italiana Pirelli.
487,580. **Two-Part Coupling.** R. Bosch A.G.

Germany

662,376. **Tire.** H. Kornhass, Friedrichroda, Thur.
663,183. **Heel.** F. Stubbe, Vlotho, Weser.
663,720. **Hot Water Bottle.** M. Hahn, Munich.
664,015. **Glove.** A. Wondzinski, Berlin.
664,380. **Tire.** Continenal Gummiwerke A.G., Hannover.
664,478. **Safety Device for Couplings.** Humboldt-Deutzmotoren A.G., Cologne.
664,497. **Hot Water Bottle.** J. Fischer, Penzig, Oberlausitz.
664,538. **Finger Cots, Etc.** H. Monnich, Berlin.

TRADE MARKS

United States

359,344. Representation of a panel showing a country scene and a robin sitting on a limb of a tree and the words: **"Red Robin."** Erasers, rubber bands, etc. Berkson Bros., Inc., Chicago, Ill.
359,374. **Superlatex.** Statuary and figurines, ornamental plaques, advertising and decorative display models, etc. Superlatex Products, Inc., New York, N. Y.
359,384. **Twillastic.** Stretchable fabric. B. Hall, New York, N. Y.
359,422. **Fix The Casing, Too.** Tire and tube patching kits. Bowes Seal Fast Corp., Indianapolis, Ind.
359,453. **Armorized.** Tires and treads. Armor Tread Tire Corp., Curtis Bay, Baltimore, Md.
359,488. **Gold Bond.** Brake lining. Southern Friction Materials Co., Charlotte, N. C.
359,586. Concentric circles containing the word: **"Whiz."** Rubber adhesive. patching and repairing outfits; rubber adhesive, rubber patching material; cement and glue for rubber. R. M. Hollingshead Corp., Camden, N. J.
359,603. **Makablok.** Brake lining. Gatke Corp., Chicago, Ill.
359,616. **Airfoam.** Cushions, pillows, mattresses, etc. Goodyear Tire & Rubber Co., Akron, O.
359,643. **But-N-On.** Dress shields. Atreo Mfg. Co., New York, N. Y.
359,654. **Heptyllys.** Aromatics. United States Rubber Products, Inc., New York, N. Y.
359,655. **Viollys.** Aromatics. United States Rubber Products, Inc., New York, N. Y.
359,758. **Burro.** Electric storage batteries. A. Setzer, doing business as Mule Battery Mfg. Co., Providence, R. I.
359,777. **Butyl Ten.** Accelerator. R. T. Vanderbilt Co., Inc., New York, N. Y.
359,860. **Tempered.** Balls. J. De Beer & Son, Albany, N. Y.
359,865. **Nutex.** Ball bladders. Dewey & Almy Chemical Co., Cambridge, Mass.
359,876. **Unico.** Tires and tubes. United Co.Operatives, Inc., Indianapolis, Ind.

New York Quotations

New York outside market rubber quotations in cents per pound

	Sept. 27, 1937	Aug. 26, 1938	Sept. 26, 1938
Plantations			
Rubber latex..*gal.*	67/68	61/62	57/58
Paras			
Upriver fine	19	15½	15⅝
Upriver fine	*24	*18¾	*18¼
Upriver coarse ..	11	11	10
Upriver coarse ..	*17	*15	*15¼
Islands fine	19	15	15
Islands fine	*23	*18	*17½
Acre, Bolivian fine	19¼	15¾	15⅞
Acre, Bolivian fine	*24¼	*18¾	*18½
Beni, Bolivian fine	19¾	16¼	16½
Madeira fine	19	15½	15⅝
Caucho			
Upper ball	11	11	10
Upper ball	*17	*15	*15¼
Lower ball	10½	10	9
Pontianak			
Pressed block.....	13½/32	10½/20	12/20
Guayule			
Duro, washed and dried	14	13¼	13¼
Ampar	14½	13¾	13¾
Africans			
Rio Nuñez	19	17	17
Black Kassai	18½	16½	16½
Prime Niger flake.	28	25	25
Gutta Percha			
Gutta Siak	11½	12¼	12
Gutta Soh	22	15	17½
Red Macassar ...	1.10/1.35	1.20/1.90	1.20/1.90
Balata			
Block, Ciudad Bolivar	30	..	..
Manaos block	28	29	27½
Surinam sheets ..	37	38	39
Amber	39	40	40

*Washed and dried crepe. Shipments from Brazil.

Market Reviews

CRUDE RUBBER

Commodity Exchange

TABULATED WEEK-END CLOSING PRICES

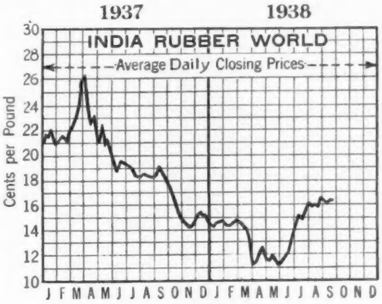
Futures	July 30	Aug. 27	Sept. 3	Sept. 10	Sept. 17	Sept. 24
Sept. ...	16.10	16.57	16.25	15.78	16.05	16.00
Oct.	.....	16.64	16.25	15.83	16.05	16.00
Dec.	16.25	16.78	16.44	15.94	16.13	16.14
Mar. ...	16.28	16.92	16.56	16.06	16.20	16.25
July	.....	17.05	16.70	16.25	16.33	16.40
Aug. ...	.....	.....	16.73	16.29	16.36	16.44
Volume per week (tons) ..	18,550	24,240	11,910	11,120	18,950	11,450

THE Commodity Exchange table published here shows prices of representative future contracts on the New York market during the last two months.

During the past month the rubber market moved erratically, being dominated by the Central European situation as well as by developments within the trade. December futures closed at 16.31¢ per pound on September 1 and dropped to 15.94¢ per pound on September 9. On September 12, the day the International Rubber Regulation Committee decided to maintain a 45% export quota for the fourth quarter, the price rose to 16.63¢ per pound. Following this the price eased somewhat, following European developments closely and closed at 16.42¢ per pound on September 22. The closing price on September 28 was 15.66¢ per pound. During the past four weeks the maximum variation in week-end closing prices for delivery during the next year was 0.51¢ per pound. Trading in general during the month was inactive.

Crude rubber consumption in the United States amounted to 38,170 long tons for August, 18.5% over the July figure and 8% under August a year ago. For the first eight months of this year consumption totalled 241,723 tons, against 397,681 tons during the like period of last year. Optimism regarding an active fourth quarter in the rubber industry is still evident. On page 74 are reported U. S. statistics on imports, consumption, stocks, and crude rubber afloat.

At its meeting on September 12 the I.R.R.C. decided to leave the export quota unchanged at 45% for the fourth quarter of 1938. On this basis agreement countries will be allowed to ship 48,560 tons per month not including under-shipments of 8,000 tons which can be made up. Shipments from Siam, French Indo-China, and nonagreement countries will probably continue to average about 10,000 tons monthly. Thus, total world rubber shipments for the second half of 1938, not allowing for the possibility of overshipments, will be approximately 377,250 tons. As world consumption during this period is expected to top 500,000 tons, world stocks should show a substantial reduction by the end of the year. The next meeting of the I.R.R.C. will be held on November 15, when, presumably, the quota decision for the first quarter of 1939 will be made.



New York Outside Market—Spot Ribbed Smoked Sheets

According to a Reuter's dispatch, the Netherland India Government has decided to extend the area devoted to the planting of rubber by 4¾% of the present area during 1939 and 1940. According to the stipulations of the I.R.R.C. preparations for the extension may be started immediately. Other major rubber producers have not yet taken any action on extending their acreages.

(*N. Y. Outside Market on Page 74*)

New York Outside Market—Spot Closing Prices—Plantation Grades—Cents per Pound

	August, 1938									September, 1938														
	22	23	24	25	26	27*	29	30	31	1	2	3*	5†	6	7	8	9	10*	12	13	14	15	16	17*
No. 1 Ribbed Smoked Sheet	16 5/16	16½	16 9/16	16½	16 9/16	..	16 1/16	16¼	16¼	16 1/16	16¼	..	..	16 3/16	16 3/16	16 1/16	15 13/16	..	16½	16⅛	16⅜	16¼	16 1/16	..
No. 2 Ribbed Smoked Sheet	15⅞	16 1/16	16⅛	16 1/16	16⅛	..	15⅝	15⅞	15⅞	15 11/16	15⅞	..	..	15 13/16	15 13/16	15 11/16	15 7/16	..	16⅛	15¾	16	15 15/16	15¾	..
No. 3 Ribbed Smoked Sheet	15¼	15 7/16	15½	15½	15 9/16	..	15 1/16	15 5/16	15 5/16	15⅛	15 5/16	..	..	15¼	15 5/16	15 3/16	14 15/16	..	15⅝	15¼	15½	15 7/16	15 3/16	..
No. 4 Ribbed Smoked Sheet	15 1/16	15¼	15 5/16	15¼	15 5/16	..	14 13/16	15	15 1/16	14⅞	15 1/16	..	..	15	15	14⅞	14⅝	..	15 5/16	14 15/16	15 3/16	15⅛	14⅞	..
No. 1 Thin Latex Crepe...	17⅛	17 5/16	17⅜	17 5/16	17⅜	..	16⅞	17⅛	17⅛	16 13/16	17 1/16	..	..	16⅞	16⅞	16 13/16	16 9/16	..	17¼	16⅞	17⅛	17⅛	16 15/16	..
No. 1 Thick Latex Crepe..	18⅜	18 9/16	18⅝	18 9/16	18⅝	..	18⅛	18 3/16	18¼	18	18¼	..	..	18 3/16	18 3/16	18 1/16	17¾	..	18⅜	18⅛	18⅜	18⅛	17 15/16	..
No. 1 Brown Crepe.......	15⅜	15 9/16	15⅝	15⅝	15 11/16	..	15 3/16	15 7/16	15 7/16	15¼	15 7/16	..	..	15⅜	15⅜	15¼	15	..	15¾	15 5/16	15 9/16	15½	15 5/16	..
No. 2 Brown Crepe.......	15¼	15 7/16	15½	15½	15 9/16	..	15 1/16	15 5/16	15 5/16	15⅛	15 5/16	..	..	15¼	15¼	15⅛	14⅞	..	15⅝	15 3/16	15 7/16	15⅜	15 3/16	..
No. 2 Amber............	15⅜	15 9/16	15⅝	15⅝	15 11/16	..	15 3/16	15 7/16	15 7/16	15¼	15 7/16	..	..	15⅜	15⅜	15¼	15	..	15¾	15 5/16	15 9/16	15½	15 5/16	..
No. 3 Amber............	15¼	15 7/16	15½	15½	15 9/16	..	15 1/16	15 5/16	15 5/16	15⅛	15 5/16	..	..	15¼	15¼	15⅛	14⅞	..	15⅝	15 3/16	15 7/16	15⅜	15 3/16	..
No. 4 Amber............	14½	14 11/16	14¾	14¾	14 13/16	..	14 5/16	14 9/16	14 9/16	14⅜	14 9/16	..	..	14½	14½	14⅜	14⅛	..	14 15/16	14 9/16	14 13/16	14⅞	14 11/16	..
Rolled Brown............	13 5/16	13½	13 9/16	13 9/16	13⅝	..	13⅛	13⅜	13⅜	13 3/16	13⅜	..	..	13 5/16	13¼	13⅛	12⅞	..	13⅝	13¼	13½	13⅝	13 7/16	..

*Closed. †Holiday.

New York Outside Market (Continued)

	September, 1938					
	19	20	21	22	23	24*
No. 1 Ribbed Smoked Sheet..............	16 1/16	16 7/16	16⅜	16 5/16	16	..
No. 2 Ribbed Smoked Sheet..............	15¾	16⅛	16 1/16	16	15 11/16	..
No. 3 Ribbed Smoked Sheet..............	15 3/16	15 9/16	15 7/16	15⅜	15 1/16	..
No. 4 Ribbed Smoked Sheet..............	14⅞	15¼	15¼	15 3/16	14⅞	..
No. 1 Thin Latex Crepe..................	16 15/16	17¼	17 3/16	17⅛	16 15/16	..
No. 1 Thick Latex Crepe.................	17 15/16	18 5/16	18⅛	18 1/16	17¾	..
No. 1 Brown Crepe.......................	15 5/16	15 11/16	15⅝	15 9/16	15¼	..
No. 2 Brown Crepe.......................	15 3/16	15 9/16	15½	15 7/16	15⅛	..
No. 2 Amber..............................	15 5/16	15 11/16	15⅝	15 9/16	15¼	..
No. 3 Amber..............................	15 3/16	15 9/16	15½	15 7/16	15⅛	..
No. 4 Amber..............................	14 11/16	15 1/16	15	14 15/16	14⅝	..
Rolled Brown	13 7/16	13⅝	13⅝	13 9/16	13¼	..

*Closed.

Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

No.	INQUIRY
2508	Manufacturer of golf balls who extracts balata from the resin.
2509	Manufacturer of dental impression rubber.
2510	Supplier of colors used in manufacturing toy balloons from latex.
2511	Information wanted on Okbar.
2512	Manufacturer of blanc fixe.
2513	Manufacturer of "Ceris," a synthetic wax.
2514	What concerns cover rubber thread.
2515	Manufacturer of mechanical device to bunch one-ounce stationery bands.

CROSS SECTIONAL PHOTOMICROGRAPH

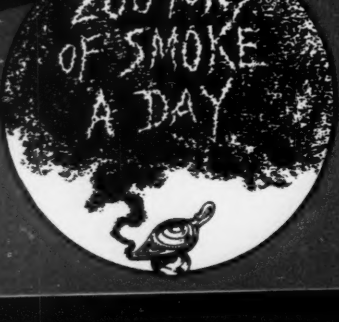
It's the 'EGG-SHELL' SURFACE *and* POROUS INTERIOR *of Micronex Beads that Insure Complete Dispersion*

Micronex Beads are built on the egg theory of an outer surface just strong enough to keep the contents in the best possible condition, and an inner mass which is porous by comparison with the shell. This unique and patented method of manufacture serves two purposes. The pellets remain intact in transit and through conveyors. Even more importantly, the exterior breaks down easily in the rubber mass resulting in the complete release of each minute carbon particle. In this respect Micronex Beads have no rival.

MICRONEX

THE *Premier* CARBON BLACK FOR RUBBER USE

Beads or Compressed



BINNEY & SMITH CO.
DISTRIBUTORS
41 East 42nd Street, New York

COLUMBIAN CARBON CO.
MANUFACTURERS

COMPOUNDING INGREDIENTS

THE demand for compounding ingredients showed continued improvement during September. With a marked increase in tire production anticipated for October, it is believed that business will show an immediate acceleration over current activity. However it should be pointed out that this step-up in production has not yet been fully realized, and there is some degree of uncertainty as to the extent of future operations. Prices in general remain at last month's levels. The price of Neoprene was lowered 10¢ per pound on September 26; the minimum price now is 65¢ per pound.

CARBON BLACK. The demand for carbon black continued to show moderate improvement during September. Black makers expect that October and November production in the rubber centers will require considerably larger quantities of black than during any preceding month of this year. Export business continued fairly good by comparison with domestic activity. Prices continued unchanged.

FACTICE OR RUBBER SUBSTITUTE. The demand for rubber substitute held at about the same level as for August. Prices remain generally steady.

LITHARGE. Car-lot prices advanced 1/10¢ per pound, and the l.c.l. prices were raised ¼¢ per pound following a rise in base metal on September 15. Demand during September was improved over the preceding month.

LITHOPONE. Market activity, although far from being brisk, showed some improvement during September. Prices held an even position.

RUBBER CHEMICALS. Sales of rubber chemicals showed a definite increase during the third quarter, and this upward trend is expected to continue during the balance of the year. There have been no general price changes, and current quotations are expected to hold during the fourth quarter.

RUBBER SOLVENTS. Demand for all grades of rubber solvents showed continued improvement during September, and further expansion in buying is anticipated for the last quarter. Prices are steady and unaffected by the recent drop in the price of crude oil at east Texas.

STEARIC ACID. Trade during the past month was somewhat more active, but consumers were disposed to limit their purchases to amounts sufficient for nearby requirements. Quotations remain at former levels.

TITANIUM PIGMENTS. With trading improved over August, it is likely that September business will prove to have been greater than in September, last year. Prices continue steady and unchanged.

ZINC OXIDE. Some increase in activity occurred in the sale of zinc oxide last month. Prices remain at previously quoted level; leaded grades were unaffected by a rise in the cost of metallic lead.

New York Quotations

September 23, 1938

Prices Not Reported Will Be Supplied on Application

Abrasives			
Pumicestone, powdered	lb.	$0.03	/$0.035
Rottenstone, domestic	lb.	.03	/ .035
Silica, 15	ton	38.00	
Accelerators, Inorganic			
Lime, hydrated, l.c.l., New York	ton	20.00	
Litharge (commercial)	lb.	.07	/ .075
Accelerators, Organic			
A-1	lb.	.26	
A-5-10	lb.	.35	/ .40
A-7	lb.	.42	/ .55
A-10	lb.	.35	/ .40
A-11	lb.	.52	/ .65
A-19	lb.	.52	/ .65
A-32	lb.	.70	/ .80
A-77	lb.	.42	/ .55
A-100	lb.	.42	/ .55
A-100-F-50	lb.	.25	/ .35
A-433	lb.	.45	/ .55
Accelerator 49	lb.	.42	
737	lb.	.42	/ .43
737-50	lb.	.25	/ .26
808	lb.	.70	/ .72
833	lb.	1.15	
Acrin	lb.	.55	
Aldehyde ammonia	lb.	.70	
Altax	lb.	.55	/ .65
B-J-F	lb.	.50	/ .55
Beutene	lb.	.70	/ .75
Butyl Zimate	lb.	3.00	
C-P-B	lb.	2.00	
Captax	lb.	.50	/ .60
Crylene	lb.	.40	/ .47
Paste	lb.	.30	/ .36
D-B-A	lb.	2.00	
Di-Esterex	lb.	.60	/ .70
N	lb.	.60	/ .70
Di-ortho-tolylguanidine	lb.	.44	/ .46
Diphenylguanidine	lb.	.35	/ .45
DOTG	lb.	.47	
DPG	lb.	.35	/ .45
El-Sixty	lb.	.50	/ .65
Ethylideneaniline	lb.	.42	/ .43
Ethyl Zimate	lb.	3.00	
Formaldehyde P.A.C.	lb.	.0625	
Formaldehydeaniline	lb.	.31	
Formaldehyde-para-toluidine	lb.	.52	/ .54
Guantal	lb.	.40	/ .50
Hepteen	lb.	.35	/ .40
Base	lb.	1.35	/ 1.50
Hexamethylenetetramine U.S.P.	lb.	.47	
Technical	lb.	.36	
Lead oleate, No. 999	lb.	.12	
Witco	lb.	.15	
Monex	lb.	3.00	
Novex	lb.		
O. N. V.	lb.	$1.00	/$1.10
O-X-A-F	lb.	.50	/ .55
Ovac	lb.	.50	/ .55
Para-nitroso-dimethylaniline	lb.	.85	
Pentex	lb.	1.00	/ 1.10
Pip-Pip	lb.	2.50	
Pipsolene	lb.	1.55	/ 1.85
R-2	lb.	1.40	/ 1.80
Base	lb.	3.65	
R-23	lb.	.40	
R & H 50-D	lb.	.42	/ .43
Rotax	lb.	.60	/ .65
Safex	lb.	1.20	/ 1.30
Santocure	lb.	1.05	/ 1.30
Super-sulphur No. 1	lb.	.50	
2	lb.	.20	/ .22
Tetrone A	lb.	3.00	
Thiocarbanilide	lb.	.24	/ .30
Thionex	lb.	3.00	
Trimene	lb.	.55	/ .65
Base	lb.	1.05	/ 1.20
Triphenylguanidine (TPG)	lb.	.52	
Tuads	lb.	3.00	
Ureka	lb.	.60	/ .75
Blend B.	lb.	.60	/ .75
C	lb.	.56	/ .65
Vulcanex	lb.	.42	/ .43
Vulcanol	lb.	.85	
Z-B-X	lb.	2.50	
Z-88	lb.	.44	/ .60
P	lb.	.51	
Zenite	lb.	.46	/ .48
A	lb.	.53	/ .55
B	lb.	.46	/ .48
Zimate	lb.	3.00	
Activator			
Barak	lb.	.50	
Age Resisters			
AgeRite Alba		1.50	/ 2.10
Exel	lb.	1.00	/ 1.02
Gel	lb.	.57	/ .77
Hipar	lb.	.65	/ .67
Powder	lb.	.52	/ .54
Resin	lb.	.52	/ .73
D	lb.	.52	/ .73
White	lb.	1.25	/ 1.75
Albasan	lb.	.70	/ .75
Aminox	lb.	.52	/ .61
Antox	lb.	.56	
B-L-E	lb.	.52	/ .61
Powder	lb.	.65	/ .74
B-X-A	lb.	.55	/ .61
Copper Inhibitor X-872	lb.	1.15	
Flectol B	lb.	.52	/ .65
H	lb.	.52	/ .65
White	lb.	.90	/ 1.15
M-U-F	lb.	$1.50	
Neozone (standard)	lb.	.63	
A	lb.	.52	/$0.54
B	lb.	.63	
C	lb.	.52	/ .54
D	lb.	.52	/ .54
E	lb.	.63	
Oxynone	lb.	.64	/ .80
Parazone	lb.	.68	
Perflectol	lb.	.65	/ .75
Permalux	lb.	1.20	
Santoflex A	lb.	.65	/ .75
B	lb.	.52	/ .65
Santowhite	lb.	.95	/ 1.20
Solux	lb.	1.30	
Thermoflex A	lb.	.65	/ .67
V-G-B	lb.	.52	/ .61
Alkalies			
Caustic soda, flake, Columbia (400 lb. drums)	100 lbs.	2.70	/ 3.55
liquid, 50%	100 lbs.	1.95	
solid (700 lb. drums)	100 lbs.	2.30	/ 3.15
Antiscorch Materials			
A-F-B	lb.	.35	/ .40
Antiscorch T	lb.	.90	
R-17 Resin (drums)	lb.	.10	
RM	lb.	1.25	
Retarder W	lb.	.36	
U.T.B.	lb.	.35	/ .40
Antisun Materials			
Heliozone	lb.	.27	
Sunproof	lb.	.27	/ .30
Colors			
BLACK			
Du Pont powder	lb.	.42	/ .44
Lampblack (commercial)	lb.	.15	
BLUE			
Brilliant	lb.		
Du Pont dispersed	lb.	.70	/ 3.60
Powders	lb.	.45	/ 3.75
Prussian	lb.	.0375	
Toners	lb.	.08	/ 3.85
BROWN			
Mapico	lb.	.11	
GREEN			
Brilliant	lb.		
Chrome, light	lb.		
medium	lb.	.22	
oxide (freight allowed)	lb.		
Dark	lb.		
Du Pont dispersed	lb.	.87	/ 1.60
Powders	lb.	1.00	/ 2.00
Guignet's, Easton, Pa., bbls.	lb.	.70	
Light	lb.		
Toners	lb.	.85	/ 3.75

ORANGE
Du Pont dispersed .... lb. $0.08 /$0.90
Powders .... lb. .80 / 2.50
Lake .... lb.
Toners .... lb. .40 / 1.60

ORCHID
Toners .... lb. 1.50 / 2.00

PINK
Toners .... lb. 1.50 / 4.15

PURPLE
Permanent .... lb.
Toners .... lb. .60 / 2.10

RED
Antimony
Crimson, 15/17% .... lb. .45
R. M. P. No. 3 .... lb. .48
Sulphur free .... lb. .50
R.M.P. .... lb. .52
Golden 15/17% .... lb. .28
7-A .... lb. .37
Z-2 .... lb. .23
Aristi .... lb. 1.75
Cadmium, light (400 lb. bbls. .... lb. .70 / .75
Chinese .... lb.
Crimson .... lb.
Du Pont dispersed .... lb. .85 / 2.05
Powders .... lb. .30 / 1.40
Mapico .... lb. .0925
Medium .... lb.
Rub-Er-Red, Easton, Pa., bbls. .... lb. .0925
Scarlet .... lb.
Toners .... lb. .08 / 2.00

WHITE
Lithopone (bags) .... lb. .04¼/ .04¾
Albalith Black Label-11 .. lb. .04¼/ .04¾
Astrolith .... lb. .04¼/ .04¾
Azolith .... lb. .04¼/ .04¾
Cryptone-19 .... lb. .05⅝/ .05¾
CB-21 .... lb. .05⅝/ .05¾
ZS No. 20 .... lb. .08¾/ .08¾
86 .... lb. .08¾/ .08¾
230 .... lb. .08¾/ .08¾
Sunolith .... lb. .04¼/ .04¾
Ray-Bar .... lb. .05⅝/ .06⅝
Ray-Cal .... lb. .05⅝/ .06⅝
Rayox .... lb. .15 / .18
Titanolith (5-ton lots) .. lb. .04⅛/ .04⅜
Titanox-A (50-lb. bags) .. lb. .15 / .1575
B (50-lb. bags) .... lb. .05⅝/ .05¾
30 ((50-lb. bags) ...... lb. .05⅝/ .05¾
C (50-lb. bags) .... lb. .05⅝/ .05¾
M .... lb. .05⅝/ .05¾
Ti-Tone .... lb.
Zinc Oxide
Azo ZZZ-11 .... lb. .0625/ .065
44 .... lb. .0625/ .065
55 .... lb. .0625/ .065
66 .... lb. .0625/ .065
French Process, Florence
White Seal-7 (bbls.) ... lb. .085 / .0875
Green Seal-8 .... lb. .08 / .0825
Red Seal-9 .... lb. .075 / .0775
Kadox, Black Label-15 ... lb. .065 / .0675
No. 25 .... lb. .075 / .0775
Red Label-17 .... lb. .065 / .0675
Horse Head Special 3 ... lb. .0625/ .065
XX Red-4 .... lb. .0625/ .065
23 .... lb. .0625/ .065
72 .... lb. .0625/ .065
78 .... lb. .0625/ .065
80 .... lb. .0625/ .065
103 .... lb. .0625/ .065
110 .... lb. .0625/ .065
St. Joe (lead free)
Black Label .... lb. .0625/ .065
Green Label .... lb. .0625/ .065
Red Label .... lb. .0625/ .065
U.S.P. .... lb. .095 / .0975
White Jack .... lb. .08¾/ .08¾
Zopaque (bags) .... lb. .15 / .1575

YELLOW
Cadmolith (cadmium yellow), 400 lb. bbls. .... lb. .45 / .50
Du Pont dispersed .... lb. 1.25 / 1.60
Powders .... lb. .70 / 1.37
Lemon .... lb.
Mapico .... lb. .0675
Toners .... lb. 2.50

Dispersing Agents

Darvan .... lb. .30 / .50
Nevoll (drums) .... lb. .0215
Santomerse S .... lb. .11 / .25

Fillers, Inert

Asbestine, c.l., f.o.b., mills .ton 15.00
Barytes .... ton 30.00 /36.00
f.o.b., St. Louis (50 lb. paper bags) .... ton 22.85
off color, domestic ...... ton 20.00 /25.00
white, imported .... ton 29.00 /32.00
Blanc fixe, dry, precip. .... lb. .03 / .035
Calcene .... ton 37.50 /43.00
Infusorial earth .... lb. .02 / .03
Kalite No. 1 .... ton 24.00 /50.00
3 .... ton 34.00 /60.00
Magnesia, calcined, heavy .. lb. .04
Carbonate, l.c.l. .... lb. .07 / .095
Pyrax A .... ton 7.50 /20.00
Whiting
Columbia Filler* .... ton 9.00 /14.00
Guilders .... 100 lbs.
Hakuenka .... lb.
Paris white, English cliff-stone .... 100 lbs.
Southwark Brand, Commercial .... 100 lbs.
All other grades ... 100 lbs.
Suprex, white extra light .. ton $45.00 /$60.00
heavy .... ton 45.00 / 60.00
Witco, c.l. .... ton 6.00

Finishes

Rubber lacquer, clear ..... gal.
colored .... gal.
Starch, corn, pwd. .... 100 lbs.
potato .... lb.
Talc .... ton 25.00 /45.00

Flock

Cotton flock, dark .... lb. .11 / .13
dyed .... lb. .45 / .85
white .... lb. .18 / .20
Rayon flock, colored ...... lb. 1.10 / 2.00
white .... lb. .90

Latex Compounding Ingredients

Accelerator 85 .... lb. .35
89 .... lb. 1.40
122 .... lb. 1.55
552 .... lb. 2.50
Aerosol .... lb. .45
Antox, Dispersed .... lb. .42
Aquarex A .... lb. .35
D .... lb. .75
F .... lb. .85
Areskap No. 50 .... lb. .18 / .24
100, dry .... lb. .39 / .51
Aresket No. 240 .... lb. .16 / .22
300, dry .... lb. .42 / .50
Aresklene No. 375 .... lb. .35 / .50
400, dry .... lb. .51 / .65
Black No. 25, Dispersed ... lb. .22 / .40
Catalpo .... ton
Collocarb .... lb. .055 / .07
Color Pastes, dispersed .... lb. .35 / 1.75
Dispersex No. 15 .... lb. .11 / .12
No. 20 .... lb. .08 / .10
Emo, brown .... lb. .15
white .... lb. .15
Factice Compound, Dispersed .... lb. .36
Heliozone, Dispersed ...... lb. .25
Igepon A .... lb.
MICRONEX, Colloidal ...... lb. .055 / .07
Nekal BX (dry) .... lb.
Palmol .... lb. .11
Pipsol X .... lb. 3.05 / 3.55
R-23 .... lb. .57
RN-2 .... lb. 1.40 / 1.80
S.1 (400 lb. drums) .... lb. .65
Santomerse S .... lb. .11 / .25
D .... lb. .41 / .65
No. 1 .... lb. .18 / .35
No. 2 .... lb. .18 / .35
No. 3 .... lb. .40 / .65
Santovar A .... lb. 1.15 / 1.40
Stablex A .... lb. .90 / 1.10
B .... lb. .65 / .90
C .... lb. .40 / .50
Sulphur, Dispersed .... lb. .10 / .15
No. 2 .... lb. .075 / .15
T.1. (400 lb. drums) ...... lb. .40
Tepidone .... lb. 1.75
Vulcan Colors .... lb.
Zinc oxide, dispersed ...... lb. .12 / .15

Mineral Rubber

Black Diamond .... ton 25.00
Genasco Hydrocarbon, granulated, (fact'y) ... ton
solid .... ton
Gilsonite Hydrocarbon (factory) .... ton
Hydrocarbon, hard .... ton 22.00 /42.00
Parmr Grade 1 .... ton 25.00 /27.00
2 .... ton 25.00 /27.00
Pioneer .... ton
285°-300° .... lb. 22.00 /42.00

Mold Lubricants

Mold Paste .... lb. .12 / .18
Sericite .... ton 65.00 /75.00
Soapbark .... lb.
Soapstone .... ton 25.00 /35.00

Oil Resistant

AXF .... lb. .40 / .45

Reenforcers

Carbon Black
Aerfloted Arrow Specification Black .... lb. .0275/ .0625
Arrow Compact Granulized Carbon Black .... lb. .0275/ .0625
"Certified" Heavy Compressed, Cabot .... lb.
Spheron .... lb.
Carbitum .... ton .58 / .63
Continental Dustless, c.l. .. lb. .0275/ .0375
Compressed c.l. .... lb. .0275/ .0375
Uncompressed, c.l. .... lb. .0275/ .0375
Disperso, c.l. .... lb. .0275/ .0375
Dixie, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. .... lb. .0275
c.l., delivered New York. lb. .0375
local stock, bags, delivered .... lb. .0625
Dixiedensed, c.l., f.o.b., New Orleans, La., Galveston or Houston, Tex. .... lb. $0.0275
c.l., delivered New York. lb. .0375
local stock, bags, delivered .... lb. .0625
Dixiedensed 66, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. .... lb. .0275
c.l., delivered New York. lb. .0375
local stock, bags, delivered .... lb. .0625
Excello, c.l., f.o.b. Gulf ports .... lb. .0275/$0.0475
delivered New York ... lb. .0375/ .0575
l.c.l., delivered New York .... lb. .0625/ .07
Fumonex, c.l., f.o.b. works. lb. .03
ex-warehouse .... lb. .045
Gastex .... lb. .03 / .07
Kosmobile, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. .... lb. .0275
c.l., delivered New York. lb. .0375
local stock, bags, delivered .... lb. .0625
Kosmobile 66, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. .... lb. .0275
c.l., delivered New York. lb. .0375
local stock, bags, delivered .... lb. .0625
Kosmos, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex. .... lb. .0275
c.l., delivered New York. lb. .0375
local stock, bags, delivered .... lb. .0625
MICRONEX Beads, c.l., f.o.b. Gulf ports ... lb. .0275
c.l., delivered, New York .... lb. .0375
local stock, bags, delivered .... lb. .0625
Mark II, c.l., f.o.b. Gulf ports .... lb. .0275
c.l., delivered, New York .... lb. .0375
local stock, bags, delivered .... lb. .0625
Standard, c.l., f.o.b. Gulf ports .... lb. .0275
c.l., delivered, New York .... lb. .0375
local stock, bags, delivered .... lb. .0625
W-5, c.l., f.o.b., Gulf ports .... lb. .0275
c.l., delivered, New York .... lb. .0375
local stock, bags, delivered .... lb. .0625
W-6, c.l., f.o.b., Gulf ports .... lb. .0275
c.l., delivered, New York .... lb. .0375
local stock, bags, delivered .... lb. .0625
Paradene No. 2 (drums) . lb. .04
Pelletex .... lb. .03 / .07
Supreme, c.l., f.o.b. Gulf ports .... lb. .0275/ .0475
delivered New York ... lb. .0375/ .0575
l.c.l. delivered New York .... lb. .0625/ .07
"WYEX BLACK" .... lb. .0275/ .0625

Clays
Aerfloted Paragon (50 lb. bags) .... ton 9.50 /22.00
Suprex (50 lb. bags) .. ton 9.50 /22.00
China .... ton 17.50 /20.00
Dixie .... ton 11.00 /30.00
Junior .... ton 9.50 /29.00
McNamee .... ton 9.50 /22.00
Par .... ton 9.50 /22.00
Witco, f.o.b. Works ...... ton 9.50
P-33 .... lb. .0475/ .0775
Thermax .... lb. .0175/ .05
Velvetex .... lb. .022 / .035

Reodorants

Amora A .... lb.
B .... lb.
C .... lb.
D .... lb.
Curodex 19 .... lb. 2.75
188 .... lb. 3.50
198 .... lb. 4.50
Rodo No. 0 .... lb. 3.50 / 4.00
10 .... lb. 4.50 / 5.00

Rubber Substitutes

Black .... lb. .07 / .125
Brown .... lb. .08 / .13
White .... lb. .08 / .135
Factice
Amberex .... lb. .19
Brown .... lb. .07 / .11
Neophax A .... lb. .1025
B .... lb. .1025
Fac-Cel B .... lb. .125
C .... lb. .125
White .... lb. .08 / .12

(Continued on page 72)

COTTON AND FABRICS

THE accompanying table of week-end closing prices on the New York Cotton Exchange shows the week-end change of representative futures covering the past two months.

The New York spot middling price closed at 8.35¢ per pound on September 1. Influenced by bearish news from Central Europe, prices fell off during the next two weeks, closing at 8.08¢ on September 9 and at 7.92¢ on September 17. The reaction brought the closing price to 8.18¢ on September 20. The closing price on September 28 was 8.11¢ per pound.

New York Cotton Exchange Week-End Closing Prices

Futures	July 30	Aug. 27	Sept. 3	Sept. 10	Sept. 17	Sept. 24
Sept.	8.60	8.25	8.05	7.86	....	....
Oct.	....	8.30	8.10	7.89	7.74	7.82
Dec.	8.70	8.36	8.15	7.93	7.77	7.86
Mar.	8.77	8.36	8.11	7.88	7.79	7.88
July	8.85	8.32	8.10	7.83	7.75	7.86

Sales at 13 southern markets totaled 529,890 bales during 14 days since September 1, against 888,903 bales for the same days one year ago.

On August 28, the Commodity Credit Corp. announced a loan of 8.30¢ a pound basis middling ⅞-inch on cotton of the 1938 crop as authorized in the Agricultural Adjustment Act of 1938.

Consumption of all cotton in domestic mills totaled 561,406 bales during August, against 449,511 in July and 603,617 in August, 1937, according to a report of the Census Bureau.

Fabrics

The cotton textile market experienced a gradual broadening of demand during the past month. There is now evidence that large consumers intend to make provisions for their estimated requirements over a period of several months ahead, which policy is a reversal of the one in effect for some months back. Raincoat manufacturers all report activity at present, and the reversible coat appears to be the fastest seller of the fall season.

The market during the past month followed the raw cotton market closely, which in turn has been dominated by developments in the European situation. Cotton goods prices, which eased under the influence of tension abroad, regained part of their lost ground. Hollands remain steady at last month's levels; tire fabrics all receded ½¢ per pound; in other fabric groups minor fractional price reductions covered a broad range.

New York Quotations

September 26, 1938

Drills		
38-inch 2.00-yard	yd.	$0.10¾
40-inch 3.47-yard		.06½
50-inch 1.52-yard		.14
52-inch 1.85-yard		.11¾
52-inch 1.90-yard		.11¼
52-inch 2.20-yard		.10¼
52-inch 2.50-yard		.09
59-inch 1.85-yard		.11½
Ducks		
38-inch 2.00-yard D. F.	yd.	.10½/.10¾
40-inch 1.45-yard S. F.		.14¾
51½-inch 1.35-yard D. F.		.15½
72-inch 1.05-yard D. F.		.21½/.22
72-inch 17.21-ounce		.23⅛
Mechanicals		
Hose and belting	lb.	.24½
Tennis		
52-inch 1.35-yard	yd.	.16⅛
Hollands		
Gold Seal and Eagle		
20-inch No. 72	yd.	.09
30-inch No. 72		.16
40-inch No. 72		.18
Red Seal and Cardinal		
20-inch	yd.	.07½
30-inch		.13¾
40-inch		.15
50-inch		.24
Osnaburgs		
40-inch 2.34-yard	yd.	.09
40-inch 2.48-yard		.08⅜
40-inch 2.56-yard		.07
40-inch 3.00-yard		.07¼
40-inch 7-ounce part waste		.06¾
40-inch 10-ounce part waste		.09¼
37-inch 2.42-yard		.08¾
Raincoat Fabrics		
Cotton		
Bombazine 60 x 64	yd.	.07½
Plaids 60 x 48		.10
Surface prints 60 x 64		.11
Print cloth, 38½-inch, 60 x 64		.04¼
Sheetings, 40-inch		
48 x 48, 2.50-yard	yd.	.07
64 x 68, 3.15-yard		.06¾
56 x 60, 3.60-yard		.05⅞
44 x 40, 4.25-yard		.04½
Sheetings, 36-inch		
48 x 48, 5.00-yard	yd.	.04¼
44 x 40, 6.15-yard		.03⅛
Tire Fabrics		
Builder		
17¼ ounce 60" 23/11 ply Karded peeler	lb.	.28
Chafer		
14 ounce 60" 20/8 ply Karded peeler	lb.	.28
9¼ ounce 60" 10/2 ply Karded peeler	lb.	.27
Cord Fabrics		
23/5/3 Karded peeler, 1 1/16" cotton	lb.	.29
15/3/3 Karded peeler, 1 1/16" cotton	lb.	.27
23/5/3 Karded peeler, 1¼" cotton	lb.	.34½
23/5/3 Combed Egyptian	lb.	.48
Leno Breaker		
8¼ ounce and 10¼ ounce 60" Karded peeler	lb.	.30

New York Quotations

(Continued from page 70)

Softeners		
Bondogen	lb.	0.98 /$1.65
Burgundy pitch	lb.	.06
Cycline oil	gal.	.14 / .20
Nuba resinous pitch (drums)		
Grades No. 1 and No. 2	lb.	.03
Grade No. 3	lb.	.04
Palm oil (Witco), c.l.	lb.	.0575
Pine tar	gal.	
Plastogen	lb.	.0775/ .125
R-19 Resin (drums)	lb.	.10
R-21 Resin (drums)	lb.	.10
Reogen	lb.	.115 / .30
Rosin oil, compounded	gal.	.40
RPA No. 1	lb.	.65
2	lb.	.65
Rubtack	lb.	.10
Tackol	lb.	.085 / .18
Tonox D	lb.	.75 / .85
Witco No. 20	gal.	.20
X-1 Resinous oil (tank car)	lb.	.01
Solvents		
Beta-Trichlorethane	gal.	
Carbon bisulphide	lb.	
tetrachloride	lb.	
Industrial 90% benzol (tank car)	gal.	$0.16
Skellysolve	gal.	
Stabilizers for Cure		
Laurex, ton lots	lb.	.13 /$0.15
Stearex B	lb.	.105 / .115
Beads	lb.	.09 / .10
Stearic acid, single pressed	lb.	.105 / .115
Stearite	100 lbs.	9.00
Zinc stearate	lb.	.23
Synthetic Rubber		
Neoprene Type E	lb.	.65
G	lb.	.70
H	lb.	.80
M	lb.	.65
Latex Type 50	lb.	.35
55	lb.	.35
56	lb.	.35
57	lb.	.35
"Thiokol" A	lb.	.30
Coating materials	gal.	2.50 / 5.00
DX	lb.	.45
Molding Powder	lb.	.61 / .71
Varnish		
Shoe	gal.	1.45
Vulcanizing Ingredients		
Sulphur		
Chloride, drums	lb.	.035 / .04
Rubber	100 lbs.	2.65
Telloy	lb.	1.75 / 2.00
Vandex	lb.	1.75 / 2.00
(See also Colors—Antimony)		
Waxes		
Carnauba, No. 3 chalky	lb.	.37⅛
2 N.C.	lb.	.39⅞
3 N.C.	lb.	.37⅛
1 Yellow	lb.	.4575
2	lb.	.4425
Montan, crude	lb.	.11

British Malaya

An official cable from Singapore to the Malayan Information Agency, Malaya House, 57 Trafalgar Sq., London, W.C.2, England, gives the following figures for August, 1938:

Rubber Exports: Ocean Shipments from Singapore, Penang, Malacca, and Port Swettenham

To	Sheet and Crepe Rubber Tons	Latex, Concentrated Latex, Revertex, and Other Forms of Latex Tons
United Kingdom	7,743	458
United States	19,981	491
Continent of Europe	9,967	286
British possessions	4,465	83
Japan	2,844	19
Other countries	905	4
Totals	45,905	1,341

Rubber Imports: Actual, by Land and Sea

From	Dry Rubber Tons	Wet Rubber (Dry Weight) Tons
Sumatra	4,892	100
Dutch Borneo	1,515	5
Java and other Dutch Islands	209	..
Sarawak	1,099	..
British Borneo	314	16
Burma	162	..
Siam	3,352	1,212
French Indo-China	474	248
Other countries	136	1
Totals	12,153	1,582

THE WORST BOSS A MAN CAN HAVE IS A BAD habit. Cultivate safe, careful habits. *"The Safe Worker," National Safety Council, Inc.*

Contents

IMPORTS, CONSUMPTION, AND STOCKS

United States and World Statistics of Rubber Imports, Exports, Consumption, and Stocks

Twelve Months	U. S. Imports* Tons	U. S. Consumption¶ Tons	U. S. Stocks Mfgrs. Importers, Dealers, Etc.† Tons	U. S. Stocks Afloat† Tons	U. K.— Public Warehouses, London Liverpool†‡ Tons	Singapore and Penang Dealers and Port Stocks†‡ Tons	World Production (Net Exports)‡ Tons	World Consumption Estimated‡ Tons	World Stocks†‡§ Tons
1936	490,858	575,000	223,000	56,567	78,462	26,969	855,600	1,044,195	538,028
1937	584,851	543,600	262,204	63,099	57,785	44,792	1,135.337	1,098.916	639,025
1938									
January	42,135	29,429	274,581	57,356	62,108	48,494	80,372	**70,623	a634,330
February	43,930	23,868	294,338	47,459	71,516	46,241	81,008	61,248	a653,791
March	35,967	30,487	299,172	41,882	76,617	50,797	81,172	78,776	a670,332
April	30,807	27,984	301,436	39,071	82,754	40,614	86,725	70,751	a668,440
May	27,410	28,947	299,720	32,859	87,215	40,598	64,406	77,270	a653,865
June	26,011	30,629	294,566	32,079	92,312	44,729	71,010	71,306	a660,003
July	22,918	32,209	284,914	40,400	95,252	45,529	81.109	74,603	...
Aug.	31,099	38,170	277,463	47,772	......	......	......	......	......

* Including liquid latex. †Stocks on hand the last of the month or year. ‡Statistical Bulletin of the International Rubber Regulation Committee. §Stocks at U. S. A., U. K., Singapore and Penang, Para, Manaos, regulated areas, and afloat. ¶Corrected to 100% from estimate of reported coverage. **Not including additional absorption from U.K. manufacturers' stocks for any month during 1937. The figure will be included in yearly total. aJapan stocks not included.

CRUDE rubber consumption by United States manufacturers during August is estimated at 38,170 long tons, against 32,209 long tons during July, an 18.5% increase, but 8% under the 41,506 (revised) long tons consumed in August, 1937, according to the R.M.A.

Gross imports of crude rubber for August are reported to be 31,099 long tons, 35.7% over the July figure of 22,918 long tons, but 36.3% under the 48,785 long tons imported in August, 1937.

Total domestic stocks of crude rubber on hand August 31 are figured at 277,463 long tons, against July 31 stocks of 284,914 long tons and 174,195 long tons on hand August 31, 1937.

Crude rubber afloat to U. S. ports as of August 31 is estimated at 47,772 long tons, against 40,400 long tons afloat on July 31 and 80,439 long tons afloat on August 31, 1937.

London and Liverpool Stocks

Week Ended	Tons London	Tons Liverpool
August 27	64,816	34,564
September 3	65,514	34,211
September 10	65,214	34,319
September 17	64,735	34,722
September 24	63,842	34,979

RECLAIMED RUBBER

United States Reclaimed Rubber Statistics—Long Tons

Year	Production	Consumption†	Consumption % to Crude	U. S. Stocks*	Exports
1936	150,571	141,486	24.6	19,000	7,085
1937	185,033	162,000	29.8	28.800	13.233
1938					
Jan.	7,698	6,940	23.6	28,900	658
Feb.	6,198	7,141	29.9	27,487	470
Mar.	6,875	8,471	27.8	25,432	459
Apr.	6,399	7,480	26.7	23,339	426
May	6,866	8,009	27.7	22,275	550
June	7,584	8,274	27.0	21,040	658
July	7,109	8,273	25.7	18,832	720
Aug.	10,472	10,732	28.1	17,892	...

*Stocks on hand the last of the month or year. †Corrected to 100% from estimate of reported coverage. *Compiled by The Rubber Manufacturers Association, Inc.*

ACCORDING to R.M.A. statistics, August reclaimed rubber consumption is estimated at 10,732 long tons, 30% greater than in July; production, 10,472 long tons; as of August 31, stocks on hand were 17,892 long tons or less than two months' supply at the August rate of consumption. There was a gradual increase in demand for reclaim during September, and reclaimers anticipate, along with other suppliers to the rubber industry, a still further improved rate of activity during the last quarter.

The market is steady with the prices of all grades of reclaim remaining at last month's levels.

New York Quotations

September 23, 1938

	Sp. Grav.	¢ per lb.
Auto Tire		
Black Select	1.16-1.18	6 / 6¾
Acid	1.18-1.22	6¾/ 7
Shoe		
Standard	1.56-1.60	6½/ 6¾
Tubes		
No. 1 Floating	1.00	12 /12¾
Compound	1.10-1.20	8 / 8¾
Red Tube	1.15-1.30	8 / 8¾
Miscellaneous		
Mechanical Blends	1.25-1.50	4¾/ 5
White	1.35-1.50	11½/12

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

RUBBER SCRAP

THE demand for scrap rubber during September showed some improvement over the preceding month. A further increase in activity is expected during the balance of the year. Export business has declined, it was reported, owing to the recent difficulties in Central Europe.

Easier prices, which are now quoted, should improve the tone of the market. All inner tube grades and scrap tire grades with the exception of tire carcass and black auto peelings declined in price; in the mechanicals group, No. 2 red, white druggists' sundries, and white mechanicals receded; hard rubber scrap is quoted at a lower figure; while boot and shoe grades remain steady.

CONSUMERS' BUYING PRICES

(Carload Lots Delivered Eastern Mills)

September 23, 1938

		Prices
Boots and Shoes		
Boots and shoes, black	lb.	$0.01 /$0.01⅛
Colored	lb.	.00¾/ .00⅞
Untrimmed arctics	lb.	.00¾/ .00⅞
Inner Tubes		
No. 1, floating	lb.	.08 / .08½
No. 2, compound	lb.	.03¾/ .04
Red	lb.	.03¾/ .04
Mixed tubes	lb.	.03⅝/ .03¾
Tires (Akron District)		
Pneumatic Standard		
Mixed auto tires with beads	ton	9.00 /10.00
Beadless	ton	12.00 /13.50
Auto tire carcass	ton	17.00 /18.00
Black auto peelings	ton	17.50 /19.00
Solid		
Clean mixed truck	ton	22.50 /25.00
Light gravity	ton	29.00 /32.00
Mechanicals		
Mixed black scrap	ton	15.00 /18.00
Hose, air brake	ton	18.00 /19.00
Garden, rubber covered	ton	10.00 /11.00
Steam and water, soft	ton	10.00 /10.50
No. 1 red	lb.	.02¾/ .03
No. 2 red	lb.	.01¾/ .02
White druggists' sundries	lb.	.03½/ .03¾
Mixed mechanicals	lb.	.01½/ .02
White mechanicals	lb.	.03¼/ .03½
Hard Rubber		
No. 1 hard rubber	lb.	.10 / .11

New York Outside Market

The outside market during September was only moderately active. A fair amount of factory and shipment business was reported. For a few days during the middle of the month London was unwilling to quote insurance rates on shipment rubber owing to the tenseness of the European situation, which retarded trading to some extent. After closing at 16 1/16¢ per pound on September 1, the price of No. 1 ribbed smoked sheets fluctuated erratically during the month to close at the same level on September 23. Action of the I.R.R.C. to hold the export quota at 45% for the fourth quarter and favorable consumption predictions offset the adverse effects of unsettled conditions in Central Europe.

The week-end closing prices on No. 1 ribbed smoked sheets follow: September 3, 16¼¢; September 10, 15 13/16¢; September 17, 16 1/16¢; and September 24, 16 1/16¢.

Editor's Book Table

NEW PUBLICATIONS

"Baldwin-Southwark." Baldwin-Southwark Corp., Philadelphia, Pa. 28 pages. Among the informative articles in the third quarterly issue of this house organ is a short discussion on the manufacture of rubber stamps and rubber printing dies which points out the utility of the firm's power equipment and platen presses for this type of work. Other subjects covered in this issue include: conservation and development of timber resources in Australia; the extrusion of aluminum alloys; cavitation in hydraulic equipment; and testing equipment used at the University of California.

"The Vanderbilt News." September-October, 1938. R. T. Vanderbilt Co., 230 Park Ave., New York, N. Y. 28 pages. This issue of the *News* illustrates the effect of the triangular acceleration of Captax-Altax-Zimate in a variety of test compounds. This triangular combination is said to retain all the good features of Captax plus Altax and also shortens the cure and increases the modulus and tensile strength. These added features which are due to the presence of Zimate, are controllable by regulating the proportions of the three ingredients.

"Grantland Rice's Gastex Football Guide. 1938." General Atlas Carbon Co., 60 Wall St., New York, N. Y. 68 pages. This booklet, which welcomes the current football season, contains the schedules of more than 200 colleges, as well as general informative data on this national sport.

"Green Book Buyers Directory," 1938-39 Edition. Oil, Paint and Drug Reporter, Inc., 59 John St., New York, N. Y. 988 pages. The twenty-sixth annual edition of this directory continues an informative service for industrial buyers and sellers in the chemical, oil, drug, and related industries. The directory which gives the name of the material, supply, etc., followed by the name and address of the manufacturer is divided into five sections. The first covers industrial materials such as chemicals, dyes, drugs, oils, and rubber compounding materials. Industrial equipment, including machinery and containers, is dealt with in the second part. Part 3 lists engineers, chemists, and technical services; while Part 4 contains a list of trade and brand names. A fifth section presents a record of United States imports and exports of principal chemicals and related materials for the years 1936 and 1937.

"Coming Problems Created by the Fair Labor Standards Act of 1938," by Allen W. Rucker in collaboration with N. W. Pickering, president, Farrel-Birmingham Co., Inc., Ansonia, Conn. 24 pages. In this pamphlet, No. 28 in a series of booklet-editorials, the authors contend that the purpose of Fair Labor Standards Act of 1938, to increase the earnings of so-called substandard labor without substantially curtailing employment or earning power, cannot be fulfilled. Both the annual manufacturing wage fund and the annual manufacturing income fund are, according to the present study, limited by external forces, and neither can be expanded beyond the limits imposed by those forces. For that reason, in the view of the authors, the attempt of the federal government to raise the income of labor in some industries will be followed by corresponding reductions in the wage income of labor in other industries.

"News about Du Pont Rubber Chemicals." E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. With a news letter of September 7 was included a report entitled "Compounding for: 1. Permanent Whiteness and Colors; 2. Transparency and 'Pure Gum' Type Stocks; 3. Freedom from Odor, Taste, and Toxicity; 4. Hollow Articles; 5. Good Aging Sulphur Chloride Cured Rubber," by Harry G. Bimmerman. As an example of transparency obtained, one compound, when plied up to seven thicknesses, a total thickness of over ½-inch, is sufficiently transparent so that lettering can be easily read through the rubber.

"Rubber in Wegen." De Rubber Stichting, Heerengracht 182, Amsterdam, Holland. This 34-page illustrated booklet was issued on the occasion of the Eighth International Road Congress and the Exhibition, "The Road in 1938." After an exposition of the work of the Rubber Stichting follow discussions of the technical properties of rubber, the use of rubber in road construction, and a list of the experimental areas paved with rubber in different parts of the Netherlands. Altogether 17 such areas were laid; in 15 of these, combinations of asphalt emulsion and latex, or asphalt and crumb rubber, were used. Of the remaining two, one was laid with Gaisman blocks; while in the other vulcanized rubber sheets were attached to the wooden surface of a bridge by means of wooden screws.

"Report of the Work of The Rubber Research Board (Ceylon) in 1937." London Advisory Committee for Rubber Research (Ceylon and Malaya), Imperial Institute, South Kensington, London, S.W.7, England. 76 pages. The seventh annual report for 1937 of the Rubber Research Scheme (Ceylon) contains individual reports by the following: chairman, director, chemist, botanist and mycologist, smallholdings propaganda officer, estate superintendent, London Advisory Committee for Rubber Research (Ceylon and Malaya), and auditor general. The technical appendix to the London committee's report included in this booklet contains information on: latex—specification and testing, preservation, concentration, and colloidal properties; rubber—softened rubber, "low water absorption" rubber, synthetic rubber (Buna), and halogen derivatives of rubber from latex; road surfacing and flooring materials—latex-cement mixtures and rubber-asphalt mixtures.

"Goodrich Tires for Tractors and Implements." The B. F. Goodrich Co., Akron, O. 68 pages. Statistical data on tires for farms are presented in this reference handbook for manufacturers, retailers, and consumers in the tractor and implement field. The booklet contains 40 pages of specifications for tractor and farm implement tires and wheels, and, in addition, descriptive information and data on the company's line of low-pressure tires for agricultural service.

"The Risk of Unemployment and Its Effect on Unemployment Compensation." James W. Horwitz. Business Research Studies No. 21, Harvard University Graduate School of Business Administration, Bureau of Business Research, Boston, Mass. 80 pages. A single national system of unemployment compensation with only one pool of reserve funds and one tax rate for all industries and all states is, according to this report, to be preferred to the existing system of individual state pools. Under existing laws, Mr. Horwitz points out, the tax rates are virtually the same in all states and for all industries. The expectation that such a system will afford equitable protection for workers in all states must be based on the assumption that the risk of unemployment for which compensation would be paid is essentially the same for all states; while the facts revealed by the present analysis of census statistics show that this assumption is entirely unwarranted.

"**A Practical Program for the Coordination of Government, Labor and Management.**" National Industrial Conference Board, 247 Park Ave., New York, N. Y. 82 pages. This booklet contains reprints of the seven addresses delivered at the twenty-second annual meeting of the National Industrial Conference Board. This meeting was held for the purpose of exchanging diversified viewpoints on a program for coordinating government, labor, and management in the hope of opening the way to a reconstruction of American prosperity. The speakers, eminent in their particular field of public and private responsibility, include: Virgil Jordan, president of the National Industrial Conference Board; Hon. A. A. Berle, Jr., assistant secretary of state; Hon. Otto S. Beyer, chairman, National Mediation Board; W. Averell Harriman, chairman of the board, Union Pacific Railroad; George H. Houston, president, Baldwin Locomotive Works; Philip Murray, chairman, Steel Workers Organizing Committee; Donald R. Richberg, attorney.

"**Synthetic Ketones.**" Carbide & Carbon Chemicals Corp., 30 E. 42nd St., New York, N. Y. This folder is the first of a new series designed to present, briefly and concisely, information on various organic chemical families. The present folder covers the applications and properties of 14 synthetic ketones which are used as industrial solvents and intermediates. A convenient table shows boiling points, vapor pressures, solubilities, and other properties of eight of these compounds.

"**Cotton Production in the United States.**" United States Department of Commerce, Washington, D. C. 40 pages. The statistics in this bulletin have been prepared to meet the earlier demand for the final figures of cotton ginned and will be incorporated with other statistics in the annual cotton report to be published after the close of the cotton year. The statistical tables in the present bulletin include data on: cotton and linter production (1899 to 1937); production of cotton by states (1934 to 1937); cotton ginned by states (1934 to 1937); cotton ginned by counties (1937); number of ginneries in 1937; and average gross weight of the several kinds of bales.

BOOK REVIEW

"**Handbook of Industrial Fabrics.**" George B. Haven. Published by Wellington Sears Co., 65 Worth St., New York, N. Y. Cloth, 5⅜ by 7¾ inches, 741 pages. Illustrated. Index. Price $2.

The second edition of this reference volume on industrial fabrics revises and extends the information contained in the first edition, which appeared in 1934. The purpose of the handbook is to extend, clarify, and present in convenient form the general stock of knowledge regarding fabrics and their physical properties such as: strength, stretch, thickness, flexibility, permeability, absorbability, and length of life. Basic information is given on cotton textiles for the rubber industry, including ducks for hose and belting, tire fabrics, sheetings, drills, etc.

The text material of the book is divided into eight chapters with the following headings: Types of Cotton; Manufacturing Processes for the Cotton Fiber; Cotton Yarn; Uses of Industrial fabrics; Organization and Properties of Industrial Fabrics; Laboratory Design and Practice; the Slide Rule, Logarithm, and Nomograph; Specifications and Test Methods. A large amount of pertinent data is contained in the volume's 69 tables. The index provides a means of ready reference to text and tabular matter.

Latex Demand Six Times Greater in Ten Years

The past decade has witnessed a phenomenal increase in the demand for rubber in the form of latex. It is of particular significance that the greater part of this increase took place during the depression years. The United States is by far the largest consumer, now importing ⅔ of the world total and, according to the figures below, was the sole importer of recognizable volume until 1934. During the past ten years U. S. imports have increased to almost six times those of 1927. Others now importing appreciable quantities are United Kingdom, Germany, and France. The figures reproduced in the table below are taken from the January, 1938, *Statistical Bulletin of the International Rubber Regulation Committee.*

LATEX STATISTICS

(Long Tons—Dry Rubber Content)

Year	Imports of Latex: U.S.A.	U.K.	Germany	France	Italy‡	Australia	Total†	*Total Net Exports of Latex
1928	4,167	....	....	....	....	....	4,167	3,643
1929	3,728	....	....	....	....	....	3,728	5,013
1930	4,449	....	....	....	....	....	4,449	5,505
1931	4,649	....	....	....	....	....	4,649	5.817
1932	5,084	....	....	....	....	....	5,084	8,683
1933	11,085	....	....	....	....	....	11,085	15,731
1934	13,070	....	....	624	....	....	13,694	19,505
1935	13,553	3.063	....	826	284	....	17,726	20,898
1936	19.875	3,580	....	1,371	230	362	25,418	28,494
1937	23,186	5,049	2,062§	1,870	358	353	32,878	34,490

*From Malava, Netherland India, Ceylon, French Indo-China, North Borneo, and Liberia.

†Owing to the absence of latex reexport statistics for these countries, the totals involve a certain amount of duplication. The quantities involved, however, are of small dimensions.

‡According to official information, the dry rubber content of Italian latex is 30% of net weight of latex imported.

§Total for last seven months of 1937 only.

BELGIUM

(*Continued from page 62*)

tor of SOFINA; president, A. R. Matthis, of the Technical Engineers School of Charleroi and chief engineer of Ateliers de Construction Electriques de Charleroi; vice president, M. G. Paquet, technical manager, Bergougnan Belge; and general secretary, P. Bourgois, laboratory head of S.A. Commerce et l'Industrie de Caoutchouc, Brussels.

The Belgian rubber industry is small, employing about 10,000 workers; but a wide range of goods is produced, and Belgian tires are internationally known. It is a good many years since the industry has had its own publication, and direct news about the activities of its technicians will be particularly welcome.

POLAND

Judging by recent figures of Poland's rubber business in 1937, there was increased activity in local factories, but chiefly in production of goods for home consumption. Imports of crude rubber jumped from 47,300 to 61,479 quintals, and of reclaim, from 2,150 to 4,587 quintals. Imports of rubber manufactures totaled 19,734, against 12,920 quintals, consisting chiefly of tires and tubes. Exports improved also, from 1,211 quintals, value 514,000 zloty, to 3,103 quintals, value 1,593,000 zloty. They consisted mainly of footwear, which rose from 925 quintals, value 333,000 zloty, to 2,162 quintals, value 776,000 zloty. Small but increasing amounts of automobile tires, thread, hospital sheeting, and insulated tape are now being exported by Poland.

Tire Production Statistics

Pneumatic Casings

	Inventory	Production	Shipments
1936	11,114,399	58,116,349	55,362,739
1937	10,767,799	55,284,415	55,466,329
1938			
Jan.	10,987,967	2,776,046	2,500,148
Feb.	10,833,036	2,238,167	2,359,098
Mar.	10,819,552	2,792,440	2,890,749
Apr.	10,316,774	2,737,235	3,272,875
May	9,855,360	2,723,524	3,405,036
June	8,762,674	3,109,170	4,066,918
July	8,201,415	3,352,601	3,947,431
Aug.	8,329,590	4,093,234	4,045,540

Inner Tubes

	Inventory	Production	Shipments
1936	10,985,273	57,247,553	54,624,321
1937	10,235,517	51,986,167	52,376,657
1938			
Jan.	10,164,141	2,417,920	2,423,856
Feb.	10,161,093	2,132,013	2,127,260
Mar.	10,129,854	2,474,821	2,544,480
Apr.	9,524,959	2,199,116	2,781,908
May	9,010,245	2,260,841	2,889,799
June	8,107,626	2,717,316	3,629,224
July	7,511,679	2,784,418	3,356,929
Aug.	7,808,270	3,814,738	3,570,011

Source: The Rubber Manufacturers Association, Inc. Figures adjusted to represent 100% of the industry.

CLASSIFIED ADVERTISEMENTS

ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE

GENERAL RATES	SITUATIONS WANTED RATES	SITUATIONS OPEN RATES
Light face type $1.00 per line (ten words)	Light face type 40c per line (ten words)	Light face type 75c per line (ten words)
Bold face type $1.25 per line (eight words)	Bold face type 55c per line (eight words)	Bold face type $1.00 per line (eight words)

Allow nine words for keyed address. *Replies forwarded without charge.*

SITUATIONS WANTED

CHEMICAL ENGINEER, FIFTEEN YEARS' EXPERIENCE IN compounding, manufacture, and sale of mechanical rubber, including technical and factory management, sales engineering and development. Have contacts with established mechanical accounts including automotive and a specialty item with unusual profit and possibilities. Address Box No. 1012, care of INDIA RUBBER WORLD.

SUPERINTENDENT, CHEMIST, DEVELOPMENT ENGINEER, PRODUCTION manager desires change. Competent to compound for mechanical rubber goods and synthetic rubber or sponge rubber products. Capable of estimating factory costs and drawing up manufacturing specifications. Eighteen years' active experience. University education. Age 39. Address Box No. 1013, care of INDIA RUBBER WORLD.

SUPERINTENDENT OR ASSISTANT DESIRES CONNECTION with small progressive company. Intimate with all manufacturing details of following lines: belting, packing, hose, rubber-covered rolls, sponge rubber, tape, soles, heels, flooring, cut goods, molded and extruded hard and soft rubber, erasers, and druggists' sundries. Competent to train inexperienced help and develop formulas and new items. Best of references. Address Box No. 1014, care of INDIA RUBBER WORLD.

SITUATION OPEN

SALESMEN WANTED ON COMMISSION TO SELL BRAND NEW line of rubber mats made from tires. Excellent new design, also automobile reliners and patches. Address Box No. 1011, care of INDIA RUBBER WORLD.

BUSINESS OPPORTUNITIES

OLD ESTABLISHED FIRM, LONDON RUBBER DEALERS specializing in Sole Crepe desires to get in touch with Merchant or Broker who can guarantee large turnover. Address Box No. 1009, care of INDIA RUBBER WORLD.

FOR SALE: CONCRETE STEEL FULLY EQUIPPED TIRE PLANT suitable for mechanical goods. Experienced labor available. L. M. Kyes, East Palestine, Ohio.

FOR SALE: DURAL RUBBER CORP. PROPERTY AT $25,000.00. 2¼ acres on R.R. siding and street; 10,000 sq. ft. of floor space; 75 H.P. Tubular Boiler; Artesian Well and Water Tower; 7 DeMattia Inner Tube Presses; 7 Inner Tube Molds; 50" Mixing Mill; 42" Mixing Mill; 42" Calender; 2-75 H.P. Motors; 10 H.P. Motor; No. 3 Royal Tuber and Motor; E. R. Air Comp. and Motor; 30" Hydraulic Press; 2-24" Hydraulic Presses; 2-20" Hydraulic Presses; 2-20" Hand Presses; Vulcanizer 4' Diam.; Vulcanizer, 3' Diam.; High and Low Pressure Pumps; Miscel. Equipment, Molds and Furniture; located in Flemington, New Jersey.

(*Advertisements continued on page 79*)

Rubber Goods Production Statistics

		1938 June	1937 June
Tires and Tubes			
Pneumatic casings			
Production	*thousands*	3,109	5,339
Shipments, total	*thousands*	4,067	5,389
Domestic	*thousands*	*	5,297
Stocks, end of month	*thousands*	8,763	12,529
Inner Tubes			
Production	*thousands*	2,717	4,716
Shipments, total	*thousands*	3,629	5,027
Domestic	*thousands*	*	4,957
Stocks, end of month	*thousands*	8,108	11,746
Raw material consumed			
Fabrics	*thous. of lbs.*	....	23,033
Miscellaneous Products			
Single and double texture proofed fabrics			
Production	*thous. of yds.*	2,505	4,259
Rubber and canvas footwear			
Production, total	*thous. of prs.*	3,970	6,455
Tennis	*thous. of prs.*	*	2,765
Waterproof	*thous. of prs.*	*	3,690
Shipments, total	*thous. of prs.*	3,742	4,778
Tennis	*thous. of prs.*	*	2,947
Waterproof	*thous. of prs.*	*	1,840
Shipments, domestic, total	*thous. of prs.*	*	4,706
Tennis	*thous. of prs.*	*	2,874
Waterproof	*thous. of prs.*	*	1,832
Stocks, total, end of month	*thous. of prs.*	20,791	22,814
Tennis	*thous. of prs.*	*	4,895
Waterproof	*thous. of prs.*	*	17,919

*Data no longer available.

The above figures have been adjusted to represent 100% of the industry based on reports received which represented 81% for 1936-37.

Source: *Survey of Current Business*, Bureau of Foreign & Domestic Commerce, Washington, D. C.

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

No.	Commodity	City and Country
*7,532	Automobile accessories and parts	Baghdad, Iraq
*7,533	Automobile accessories	Manila, Philippine Islands
*7,534	Druggists' sundries and specialties	Toronto, Canada
†7,563	Rubber-finished leather	Montreal, Canada
‡7,568	Office supplies, fountain pens, novelties, and toys	Rio de Janeiro, Brazil
†7,573	Inner tubes and tread peelings	Kobe, Japan
*7,574	Advertising novelties	Buenos Aires, Argentina
*7,585	Automobile accessories	Penang, S. S.
*7,586	Toys, dolls, and games	Johannesburg, South Africa
*7,587	Toys and sporting goods	Brussels, Belgium
*7,608	Druggists' sundries and combs	Barranquilla, Colombia
*7,610	Gloves	Mexico City, Mexico
¶7,623	Nipples and pacifiers	Singapore, S. S.
†7,640	Novelties	Antwerp, Belgium
†7,651	Rubber and balata belting	Jerusalem, Palestine
†7,663	Tire retreading machinery	London, England
*7,674	Druggists' sundries	Habana, Cuba
*7,680	Elastic fabrics	Beirut, Syria
*7,686	Druggists' sundries, fountain pens, and toys	Calcutta, India
*7,694	Automobile accessories and parts	Mexico City, Mexico
*7,713	Reclaimed rubber	Warsaw, Poland
‡7,718	Rubber-soled shoes	Alexandria, Egypt
*7,723	Rubber boots and shoes	Korcha, Albania
*7,741	Automobile accessories and parts	London, England
*7,743	Carbon black	Rio de Janeiro, Brazil
*7,756	Elastic webbing for boots	Mexico City, Mexico
†7,759	Office and school supplies	Sofia, Bulgaria
*7,764	Sporting goods	Manila, Philippine Islands
†7,775	Rubber chemicals	Pratteln, Switzerland
*7,783	Automobile parts	Buenos Aires, Argentina
†7,800	Galoshes	London, England
‡7,862	Tires	Tirana, Albania

*Agency. †Purchase. ‡Purchase and agency. ¶Purchase or agency.

U. S. Crude and Waste Rubber Imports for 1938

	Plantations	Latex	Paras	Africans	Centrals	Guayule	Totals 1938	Totals 1937	Balata	Miscellaneous	Waste
Jan. ....*tons*	39,744	1,259	411	177	6	538	42,135	32,820	41	526	8
Feb.	41,709	1,400	453	150	..	218	43,930	43,289	35	808	22
Mar.	34,252	861	371	278	..	205	35,967	52,039	37	555	93
Apr.	29,662	690	324	...	1	130	30,807	35,850	73	1,046	33
May	25,967	696	195	326	1	225	27,410	50,840	32	647	5
June	25,141	640	20	60	..	150	26,011	48,956	35	901	23
July	21,883	656	64	52	9	254	22,918	39,108	57	828	12
Aug.	29,560	880	170	170	..	319	31,099	48,785	84	649	14
Total 8 mos., 1938.......*tons*	247,918	7,082	2,008	1,213	17	2,039	260,277	....	394	5,960	210
Total 8 mos., 1937.......*tons*	329,332	15,172	4,551	782	90	1,760	....	351,687	226	5,409	2,904

Compiled from The Rubber Manufacturers Association, Inc., statistics.

United States Latex Imports

Year	Pounds (d.r.c.)	Value
1936	44,469,504	$6,659,899
1937	51,934,040	10,213,670
1938		
Jan.	3,135,524	494,242
Feb.	3,772,897	560,883
Mar.	2,192,459	327,844
Apr.	1,991,943	295,690
May	1,968,576	279,502
June	1,556,507	214,420
July	1,420,136	209,526

Data from Leather and Rubber Division, United States Department of Commerce, Washington, D. C.

World Net Imports of Crude Rubber

Year	U.S.A.	U.K.†	Australia	Belgium	Canada	Czechoslovakia	France	Germany	Italy	Japan	Russia	Rest of the World	Total
1936	475,500	62,700	14,400	9,600	27,900	8,800	56,800	71,800	16,000	61,700	31,000	64,600	831,300
1937	592,528	137,351	19,257	14,969	36,087	13,063	59,959	98,170	23,980	62,205	30,462	72,745	1,115,856
1938													
Jan.	45,596	17,811	617	1,258	1,789	1,102	4,780	6,314	1,809	4,935	693	5,896	90,247
Feb.	40,977	19,149	621	974	615	1,771	5,420	6,959	2,000	3,173	2,341	5,677	87,033
Mar.	42,075	18,134	1,084	961	2,123	1,323	4,823	10,768	1,365	6,222	2,162	5,976	94,794
Apr.	31,870	16,572	647	904	999	920	5,721	6,497	2,397	5,456	4,281	5,871	80,216
May	27,809	17,783	1,087	1,137	2,545	957	5,249	9,595	2,422	3,328	4,163	6,858	79,825
June	26,429	15,314	825	853	3,243	988	4,552	7,478	2,399	2,145	2,000*	6,567	71,532

*Estimated. †U. K. figures show gross imports, not net imports. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

Shipments of Crude Rubber from Producing Countries

Year	Malaya including Brunei and Labuan	N.E.I.	Ceylon	India	Burma	North Borneo	Sarawak	Siam	French Indo-China	Total	Philippines and Oceania	Liberia†	Other Africa	South America	Mexican Guayule	Grand Total
1936	353,700	309,600	49,700	8,600	5,800	8,200	21,000	34,600	40,800	832,000	1,600*	1,600	4,500	14,700	1,200	855,600
1937	469,960	431,674	70,358	9,778	7,232	13,213	25,922	35,551	43,374	1,107,062	1,617*	2,251	5,427	16,288	2,692	1,135,337
1938																
Jan.	30,998	26,466	5,222	841	538	1,307	3,485	2,897	6,088	77,842	138	501	415	938	538	80,372
Feb.	37,166	27,366	5,216	639	770	918	8	3,266	3,070	78,419	125	168	438	1,640	218	81,008
Mar.	33,567	31,268	3,834	532	703	853	1,564	2,837	3,213	78,371	159	108	501	1,883	150	81,172
Apr.	44,744	28,487	1,951	485	842	1,158	1,728	1,583	3,647	84,625	201	308	318	1,085	188	86,725
May	28,011	22,036	2,833	909	561	815	1,648	2,507	3,118	62,438	120	175	284	1,160	229	64,406
June	28,048	24,428	3,693	625	693	643	2,441	3,906	4,773	69,250	198	250*	353	809	150	71,010
July	26,735	34,913	3,846	621	482	937	2,057	4,707	5,139	79,437	150*	250*	350*	722	200*	81,109

*Estimated. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

Classified Advertisements

Continued

MACHINERY AND SUPPLIES FOR SALE

CONSOLIDATED OFFERS: 2-HYDRAULIC MULTIPLE RAM Mat or Belt Presses: 1-5′ 3″ x 15′ and 1-3′ 6″ x 26′, with heated platens, all valves and fittings. Can be seen in operation. Must be moved in 10 days. Cheap. **Consolidated Products Co., Inc., 13-16 Park Row, New York City.**

FOR SALE: FIVE BIRMINGHAM 36″ MILLS, DRIVEN BY AND direct connected to a General Electric 125 H.P. synchronous motor, 150 r.p.m., 3 phase, 60 cycle, with controls; will divide. Also, one 450 ton BURROUGHS HYDRAULIC MOULDING PRESS, 3 ram type, platens 60″ by 15″; and one SOUTHWARK HYDRAULIC MOULDING PRESS, single ram, 120 tons; platens 42″ x 10″. C. G. Wyatt Machinery, 1203 Princess Ave., Camden, N. J.

MACHINERY AND SUPPLIES WANTED

WANTED: MANUFACTURER REQUIRES 22″ x 60″ CALENDER. Submit maker's name, year built, and serial number. Describe condition and completeness. Address Box No. 1008, care of India Rubber World.

WELLMAN SOLE CUTTING MACHINE REQUIRED, ANY MODEL, must be in good condition. Send full particulars, price, etc., to Box No. 1015, care of India Rubber World.

MISCELLANEOUS

METAL BOND CEMENT APPLIED COLD WILL unite vulcanized rubber to metal, wood, or other surfaces with which it is usually difficult to secure a good bond. KENNETH R. ELWELL, La Grange, Ill.

WANTED: SPONGE RUBBER CORD OR THREAD FROM .035″ to .080″. Response must guarantee adequate supply at fair price. Address Box No. 1010, care of India Rubber World.

United States Statistics

Imports for Consumption of Crude and Manufactured Rubber

	June, 1938		Six Months Ended June, 1938	
UNMANUFACTURED—*Free*	Quantity	Value	Quantity	Value
Liquid latex (solids)......*lb.*	1,556,507	$214,420	14,617,906	$2,172,581
Jelutong or pontianak....*lb.*	2,005,646	276,126	11,555,867	1,814,328
Balata ....*lb.*	77,133	11,496	569,679	85,848
Gutta percha ....*lb.*	43,005	12,547	381,875	69,131
Guayule ....*lb.*	337,000	41,518	3,299,708	402,997
Siak ....*lb.*	11,200	1,461	115,938	13,701
Scrap and reclaimed......*lb.*	975,984	15,320	2,904,378	41,646
Totals	5,006,475	$572,008	33,445,351	$4,600,232
Misc. rubber (above), 1,000 *lbs.*	5,006	$572,008	33,445	$4,600,232
Crude rubber.......1,000 *lbs.*	58,201	7,150,115	468,438	66,358,983
Totals ....1,000 *lbs.*	63,207	$7,722,123	501,883	$70,959,215
Chicle, crude ....*lb.*	489,607	$129,720	5,885,318	$1,836,571
MANUFACTURED—*Dutiable*				
Rubber tires ....*no.*	3,005	$5,043	11,038	$42,002
Rubber boots, shoes, and overshoes ....*prs.*	10,054	2,889	36,898	7,489
Rubber soled footwear with fabric uppers ....*prs.*	120,495	22,730	439,612	97,288
Golf balls ....*no.*	45,036	5,203	400,221	39,151
Lawn tennis balls........*no.*	69,854	7,744	420,760	40,718
Other rubber balls.......*no.*	129,715	3,156	1,598,659	57,079
Other rubber toys........*lb.*	15,899	2,893	189,033	28,994
Hard rubber combs......*no.*	73,872	5,084	297,740	20,344
Other manufactures of hard rubber	......	1,039	......	8,652
Friction or insulating tape.*lb.*	4,550	243	47,525	2,622
Belts, hose, packing, and insulating material	......	5,092	......	38,509
Druggists' sundries of soft rubber	......	5,550	......	33,847
Inflatable swimming belts, floats, etc. ....*no.*	19,372	1,859	361,729	29,165
Other rubber and gutta percha manufactures....*lb.*	44,382	15,038	437,541	108,065
Totals	......	$83,563	......	$553,925

Exports of Foreign Merchandise

RUBBER AND MANUFACTURES				
Crude rubber ....*lb.*	893,885	$116,458	5,683,903	$811,765
Balata ....*lb.*	34,166	7,505	233,783	66,759
Other rubber, rubber substitutes and scrap........*lb.*	......	......	92,047	10,993
Rubber manufactures (including toys)	......	811	......	6,543
Totals	......	$124,774	......	$896,060

Exports of Domestic Merchandise

RUBBER AND MANUFACTURES				
Reclaimed ....*lb.*	1,473,498	$73,442	7,208,183	$402,947
Scrap ....*lb.*	5,615,526	86,851	32,200,735	507,742
Cements ....*gal.*	12,971	13,435	185,005	167,659
Rubberized auto cloth.*sq. yd.*	23,610	13,766	164,885	78,889
Other rubberized piece goods and hospital sheeting..*sq. yd.*	131,576	46,146	1,098,427	430,501
Boots ....*prs.*	2,811	6,900	50,596	110,629
Shoes ....*prs.*	10,938	8,632	137,420	67,099
Canvas shoes with rubber soles ....*prs.*	37,858	29,580	277,593	189,619
Heels ....*doz. prs.*	28,484	18,655	219,218	116,577
Soling and top lift sheets.*lb.*	33,944	6,923	196,734	37,450
Gloves and mittens..*doz. prs.*	8,321	18,802	48,849	100,710
Water bottles and fountain syringes ....*no.*	20,909	6,872	111,336	36,921
Other druggists' sundries...	......	43,181	......	274,392
Gum rubber clothing....*doz.*	34,122	58,649	161,215	313,975
Balloons ....*gross*	41,653	34,394	233,032	163,180
Toys and balls.............	......	7,516	......	51,926
Bathing caps ....*doz.*	3,863	8,304	27,424	56,929
Bands ....*lb.*	24,473	9,442	132,652	51,946
Erasers ....*lb.*	19,847	12,946	155,991	91,367
Hard rubber goods	8,273	6,875	107,496	74,900
Electrical battery boxes.*no.*	16,333	4,803	187,786	41,053
Other electrical ....*lb.*	13,925	7,302	110,432	46,928
Combs, finished ......*doz.*	......	11,336	......	93,256
Other hard rubber goods..				
Tires	12,276	230,850	111,367	2,178,561
Truck and bus casings..*no.*	46,466	537,741	302,896	3,107,403
Other auto casings.....*no.*	40,504	66,394	268,613	440,999
Tubes, auto ....*no.*	5,421	39,117	37,676	293,619
Other casings and tubes..*no.*				
Solid tires for automobiles and motor trucks....*no.*	315	5,746	1,753	46,415
Other solid tires........*lb.*	17,955	4,496	302,360	54,837
Tire sundries and repair materials	......	59,843	......	343,182
Rubber and friction tape..*lb.*	52,987	16,927	339,006	104,410
Fan belts for automobiles.*lb.*	50,127	28,304	263,041	140,725
Other rubber and balata belts ....*lb.*	228,530	118,932	1,374,784	709,872
Garden hose ....*lb.*	70,904	14,612	345,205	67,411
Other hose and tubing....*lb.*	411,604	159,426	2,204,897	824,492
Packing ....*lb.*	89,619	38,081	536,809	258,947
Mats, matting, flooring, and tiling ....*lb.*	67,350	9,543	463,132	69,698
Thread ....*lb.*	34,437	24,795	216,780	150,733
Gutta percha manufactures.*lb.*	111,172	35,044	442,321	140,092
Other rubber manufactures..	......	90,858	......	613,676
Totals	......	$2,015,461	......	$13,051,667

Rubber Questionnaire

Second Quarter, 1938*

	Long Tons			
RECLAIMED RUBBER	Inventory at End of Quarter	Production	Shipments	Consumption
Reclaimers solely (6)..................	6,565	8,087	9,180	....
Manufacturers who also reclaim (16)..	6,463	7,446	1,037	7,353
Other manufacturers (101)............	5,104	....	....	8,876
Totals	18,132	15,533	10,217	16,229

	Long Tons		
SCRAP RUBBER	Inventory	Consumption	Due on Contracts
Reclaimers solely (6)..................	48,029	9,378	3,961
Manufacturers who also reclaim (15)....	44,842	9,545	2,266
Other manufacturers (11)..............	168	....	....
Totals	93,039	18,923	6,227

Tons of Rubber Consumed in Rubber Products and Total Sales Value of Shipments

PRODUCTS	Rubber Consumed Long Tons	Total Sales Value of Shipments of Manufactured Rubber Products
Tires and Tire Sundries		
All types pneumatic casings (except bicycle, airplane)	42,048	$67,276,000
All types pneumatic tubes (except bicycle, airplane)	6,452	9,139,000
Bicycle tires, including juvenile pneumatics (single tubes, casings, and tubes)............	405	1,067,000
Airplane tires and tubes..................	47	204,000
Solid and cushion tires for highway transportation	76	130,000
All other solid and cushion tires..............	21	230,000
Tire sundries and repair materials.............	2,060	3,372,000
Totals	51,109	$81,418,000
Other Rubber Products		
Mechanical rubber goods......................	5,423	$20,776,000
Boots and shoes..............................	2,802	7,877,000
Insulated wire and cable compounds............	1,202	†
Druggists' sundries, medical and surgical rubber goods	522	1,780,000
Stationers' rubber goods.....................	412	586,000
Bathing apparel	143	921,000
Miscellaneous rubber sundries................	426	971,000
Rubber clothing..............................	101	426,000
Automobile fabrics...........................	44	264,000
Other rubberized fabrics.....................	680	1,905,000
Hard rubber goods............................	392	1,715,000
Heels and soles..............................	2,123	3,689,000
Rubber flooring	191	368,000
Sponge rubber	537	760,000
Sporting goods, toys, and novelties..........	469	1,728,000
Totals	15,467	$43,766,000
Grand totals—all products....................	66,576	$125,184,000

Inventory of Rubber in the United States and Afloat

	Long Tons	
	Crude Rubber on Hand	Crude Rubber Afloat
Manufacturers	139,024	3,429
Importers and dealers........................	110,096	28,063
Totals	249,120	31,492

*Number of rubber manufacturers that reported data was 175; crude rubber importers and dealers, 44; reclaimers (solely), 6; total daily average number of employes (reporting manufacturers and reclaimers), 119,264.

It is estimated that the reported grand total crude rubber consumption is 76.0%; grand total sales value, 80%; the grand total crude rubber inventory, 84.6%; afloat figures, unavailable; the reclaimed rubber production, 74.5%; reclaimed consumption, 68.3%; and reclaimed inventory, 86.2% of the total of the entire industry.

†Owing to the difficulty of securing representative sales figures this item has been discontinued.

Compiled from statistics supplied by The Rubber Manufacturers Association, Inc.

Imports by Customs Districts

	June, 1938		June, 1937	
	*Crude Rubber Pounds	Value	*Crude Rubber Pounds	Value
Massachusetts	6,475,463	$839,776	12,833,190	$2,734,032
Buffalo	......	......	80	8
New York	38,579,199	4,523,018	69,507,584	14,029,645
Philadelphia	953,466	90,634	1,328,990	275,544
Maryland	125,470	14,307	1,793,026	319,084
Virginia	168,000	17,099	......	......
Georgia	......	......	303,393	72,468
Mobile	......	......	1,427,718	297,593
New Orleans	2,088,836	235,191	2,467,992	563,812
Los Angeles	1,468,613	167,411	7,986,832	1,663,997
San Francisco	705,720	81,989	204,016	39,011
Oregon	33,485	3,760	11,200	2,362
Hawaii	......	......	448	89
Ohio	......	......	46,259	12,486
Colorado	89,750	8,821	168,000	30,629
Totals	50,688,002	$5,982,006	98,078,728	$20,040,760

*Crude rubber including latex dry rubber content.